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American
cinematographer



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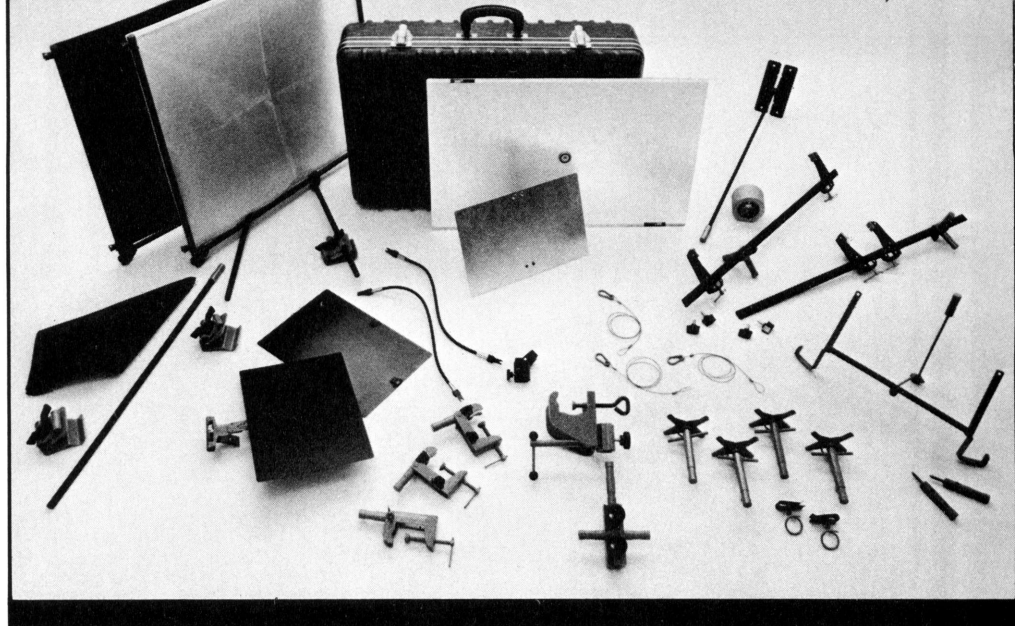
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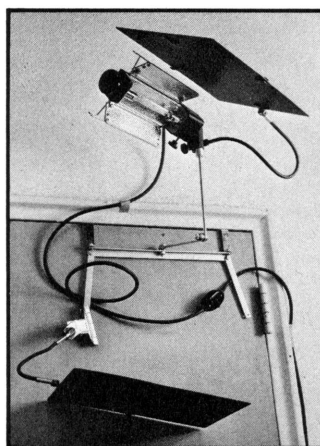
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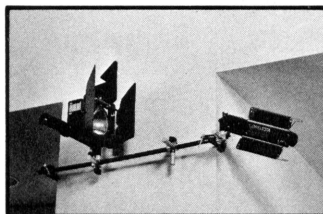
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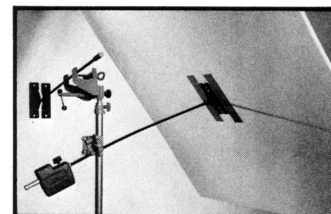
Flags shadow light secured by Tota-mount.



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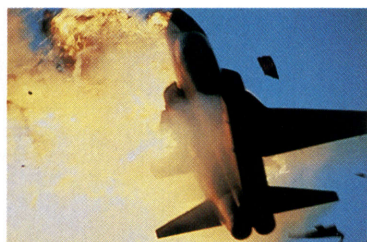


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Features



- 28 **Miniatures, Pyrotechnics for *Top Gun***
Documentary realism keynote of special effects
- 34 ***Doctor X*—A Technicolor Landmark**
UCLA resurrects lost classic
- 46 **Imaginative Lighting for *Hard Choices***
Night exteriors in open country pose challenge
- 52 **Stirring Up *Big Trouble in Little China***
Cundey & Carpenter create spectacular
- 60 **Big Effects for *Big Trouble***
Ghosts, idols, oriental fantasies abound
- 72 **Production Design For *Big Trouble***
Analyzing, storyboarding overall look
- 76 ***Belizaire the Cajun*—a Gumbo Western**
Hand-held cinematography in the bayous



Departments

- 85 **Post-Production**
Mussolini – Electronic Editing
- 91 **Editing**
173 *Precious Images* in 6½ minutes
- 95 **Sound**
Digital Recording in the Field
- 10 **Letters**
- 14 **What's New**
- 24 **The Bookshelf**
- 104 **Classified Ads**
- 109 **Ad Index**
- 110 **Roster**
- 111 **From the Clubhouse**
- 112 **The Last Page**

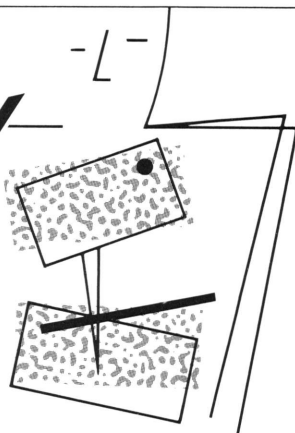


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The American Society of Cinematographers is not a labor union or a guild, but is an educational, cultural and professional organization. Membership is by invitation to those who are actively engaged as Directors of Photography and have demonstrated outstanding ability. Not all cinematographers can place the initials ASC after their names. ASC membership has become one of the highest honors that can be bestowed upon a professional cinematographer, a mark of prestige and distinction.

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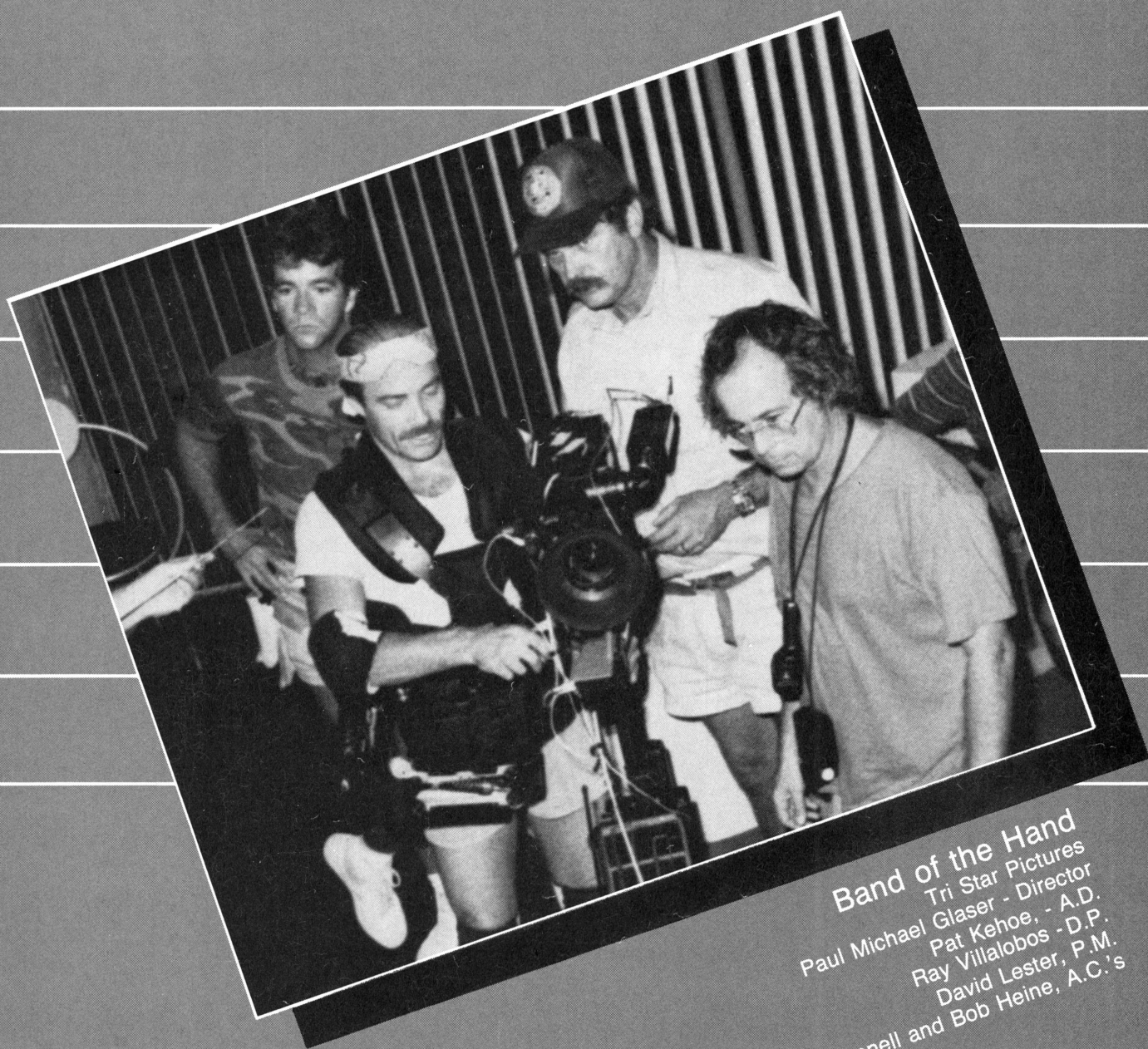
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None of these award-winning pictures was shot with cameras from Clairmont Camera. But they were all shot with Arriflex 35BLs. We have more of those than any other rental house in America. So we're glad these cameras are being chosen by some award-winning cameramen.

Helping

It's the *camera crews* who are earning Cinematography Awards and Nominations, of course, not Arriflex. But we think Arriflex and Zeiss deserve a salute—for designing cameras and lenses that are evidently helping some talented people to win accolades.

Majority of Cinematography Awards since 1975

Since 1975, in fact, the *majority* of Academy Awards for Cinematography have been won by cameramen who used Arriflex 35BL sync-sound cameras on their pictures. Plus Arriflex 35-2C and 35-3 wild cameras, of course. And Zeiss lenses.

People

Naturally, we want to congratulate the camera crews, too. *And* those camera people who have won Clios and Emmies with Arriflex cameras and Zeiss lenses—ours or not.

Because the Academy Award for Cinematography has been won by cameramen shooting with Arriflex 35BL cameras, three years in a row.

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OUT OF AFRICA
David Watkin

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THE KILLING FIELDS
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Sven Nykvist

And this year,
the Sound
Academy Award
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OUT OF AFRICA

The *Out Of Africa* sound team:
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Letters

Recognition, Please!

In your January 1986 article "Explorer Series Goes High and Low", you assigned only one photo credit at the beginning of the article to Matthew Lee. As a production manager for NGS/WQED, I was in fact responsible for the Herculaneum photographs printed on pages 63 and 64. (As for the third photograph of Joe Seamans, "Have donkey will travel"—I have no idea who took that one.) With all due respect to cinematographers, it would be nice if you'd give still photographers proper credit as well.

I might also mention that since assistant cameraman Mark Knobil and soundman George Shafnacker appear in said photos, you might have included their names in the photo captions. We all enjoy a little recognition now and then.

—Gail Williams
Los Angeles

We can only use what is provided by the source (WQED). The source did not know the photographer, nor did it identify the people in the photos. Tsk. We always say when we know!

Cranking Rate

Regarding the question raised by Kevin Brownlow in the April issue about the frame rate for photographing silent films, I think the answer may be found in Terry Ramsaye's book, "A Million and One Nights." Inasmuch as the book was published in 1926, I expect it was accurate.

"In actual practice of the motion picture, rates vary to a marked degree from the assumed standard. The public has grown experienced in screen seeing, while exhibitors are impatient to clear their houses rapidly for new audiences, or seek to crowd their programs with many subjects, tending to increase the projection rate.

"This in turn has resulted in a time war between directors and exhib-

itors. Seeking to thwart the racing of the projectors in the theatres, directors have often tended to speed up the cameras in the studios, thus lengthening the pictures. The lack of firm standardization of practice in this relation leaves the director considerably at the mercy of the projection machine in the matter of screen tempo, sometimes seriously affecting the dramatic effect.

"The Society of Motion Picture Engineers in 1925 recommended standardization at 60 feet per minute in the camera and 80 feet per minute in the theatre projector. This rate is close to average, and denotes the public desire to have its picture drama injected under greater pressure with an increasing dose, bigger than life and one and a third times as fast. Theatre speeds of 90 to 100 feet a minute are common ..."

"The camera crank wrings the emotion of the audience."

—David Samuelson, FRPS,
FBKS, BSC
London

Name Change

We appreciate the fact that *American* Cinematographer constantly keeps the industry apprised of advances in the state-of-the-art and, in keeping with that policy, ran a story in the April issue on Cinema Products' new CP35E 35mm camera.

However, to most accurately reflect the intended use of this new camera, we have now changed the name to FX35, as the camera is uniquely designed for the requirements of special effects filmmakers. As compared to the original CP35, the FX35 is a totally new camera, both electronically and mechanically.

If there is a way your readers could be made aware of this change, we would certainly appreciate it.

—Ed DiGiulio
Los Angeles

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Why a New Lightflex

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- **For the Assistant**, Lightflex had to be easy to use. That means it must be simple to set up, easy to maintain, and easier to handle with fewer parts required and fewer cases to hold it all.
- **For the Cameraman**, the System had to perform with predictability and repeatability. Lightflex is a creative tool. It must not be another worry.
- **For the Producer**, Lightflex simply had to be more affordable. It must add production values but not slow down production.

Three Significant Improvements

The redesign achieved major improvements in three main areas:

- The light source itself.
- The optical performance of the reflector design.
- The power handling and light control portion of the system.

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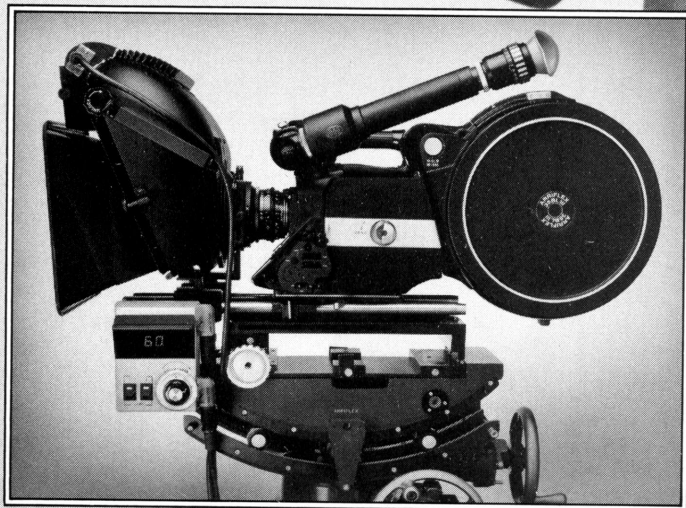
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Video Mural-in-Motion at Epcot

Mural in motion, a high-tech attraction at Epcot's Living Seas



A multi-video show system featuring high resolution distribution of 35 independent images on a large monitor array is a technological attraction for visitors at United Technologies Corporation's (UTC) Living Seas pavilion, Epcot Center, Lake Buena Vista, Fla. It marks the first time film and video technology have been merged in such a manner to create a large scale format, high definition video display.

The 147-second program, shown continuously at the pavilion, vividly illustrates the broad range of technologies and products that comprise UTC.

"The Living Seas," which opened January 15, 1986, features a giant six-million-gallon "ocean" filled with colorful sea life of every kind. The Walt Disney World attraction is the

largest facility ever dedicated to man's relationship with the oceans.

The multi-video show, one of several exhibits within the pavilion, uses a customized 35 television screen system to create a wall-sized "mural-in-motion."

According to Gerald E. Nason, manager-advertising for UTC, the original marketing concept was "to create a dramatic video production illustrating a profile of UTC" for visitors to the Living Seas. "We wanted something special, something that added to the other high technology, futuristic sights and sounds prepared by Disney in the pavilion," said Nason.

To accomplish their objectives at the pavilion, United Technologies enlisted BHA Design, Inc., Mamaroneck, N.Y., to create and produce the program. "The challenge

here," said Barry Howard, director and executive producer, BHA Design, "was to create an intriguing and unusual program that would capture the attention of millions of visitors to The Living Seas. We recommended multi-image video as the solution."

To meet the high definition that United Technologies required, a totally new system had to be developed. New technical production methods for timing, pacing, rhythm and interplay between images, as well as revolutionary hardware and software systems, are behind the scenes of the moving mural.

"Technically," said Howard, "the program is a unique synthesis of recently developed film and video production and post-production techniques. Aesthetically, the program opens up a new frontier of visual effects involving the interplay of multiple moving images that can constantly vary in size and format."

Howard noted that the initial imagery was shot on special format 35mm motion picture footage for maximum image resolution. All scenes were shot on-location in Paris, Singapore, Hong Kong and several North American locations. Footage was also used from outer space.

Further, computer-controlled optical processing was used to select and separate individual image elements for later reconfiguration.

This step was followed by a color-corrected film to video tape transfer of all show elements on video source reels. Assembly of the final show followed on state-of-the-art editing equipment with 35 separate program segments produced on a single master tape.

Since no video facility in the world allows 35 independent images to be edited simultaneously, the creative work was completed sight unseen. Then, testing and simulation of com-

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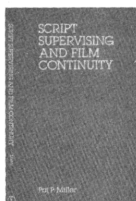
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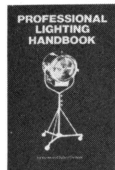
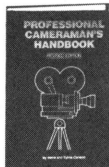
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pleted work was made using digital effects techniques. Finally, all 35 show segments were transferred to optical video discs for playback on 35 synchronized players.

Images are supplied to each screen by a dedicated, synchronized, computer-controlled video laser disc player. The players are connected to a master computer which properly synchronizes the images. This system is capable of shifting stored imagery every 1/30th of a second. At any given moment, anywhere from 35 separate images to a single, large panorama are displayed on the 9' x 14' array. The system recycles automatically and the program was produced for continuous playback.

Numerous challenges were encountered in creating the program. These included maintaining color consistency and screen-to-screen continuity (35 images were accounted for every frame for two-and-a-half minutes); maintaining correct synchronization frame-by-frame (150,000 frames were synchronized); and designing and executing the program without previews during the editing process.

To control the project, an elaborate paper edit was completed in advance and Howard said the post-production process was "more akin to animation work than traditional film or video editing." He said extensive numerical records were kept and imaginative computer programs created to keep track of all information.

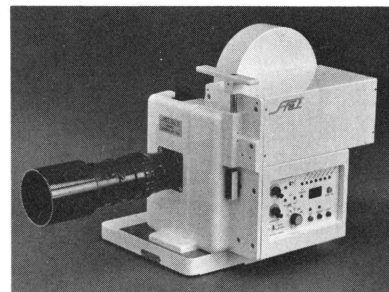
Although the program is only 147 seconds in duration, there are actually 87-and-a-half minutes of programming in the show. An original music score and a complex sound effects track enhance the dramatic impact of the program.

Producing the program for United Technologies were: BHA Design, Inc., of Mamaroneck, N.Y. Barry Howard director/executive producer; Howard Cutler, producer; Scott Palamar, technical direction; Elizabeth Moyer, co-producer for film; Timothy Housel, director of photography; Steven Wechsler, video/audio editor; Andrew Howard, programmer; Lyn Henley, production coordinator; and Ron Frangipani, original music score.

VCA Teletronics, New York City (technical post-production, editing).

Andy Kadison, videotape editor; Gary Bradley, director of editorial; Frank Minerva, Jr., technician.

Also assisting were: The Optical House (opticals). (Richard Swanek, Robert Rowohl, and John Alagna.) Du-Art Labs (film processing). (Don Donigi.) Electrosonics, Inc., Minneapolis (hardware system engineering and manufacturing). (John Salhus, John Lillycrap.)



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APAS, which literally stands for "Add Pipe and Shoot", is a system, consisting of seven highly compact and versatile fresnel, soft and flood lights, plus all the clamps, scrims and gel frames necessary to turn even the most cramped quarters into a well lit, well controlled, studio environment.

Included with APAS are application recommendations to handle a variety of lighting chores. While primarily designed for permanent or semi-permanent installation, the APAS Travel Pak and Stand Pak make APAS an excellent choice for location film-making, video taping or live broadcast.

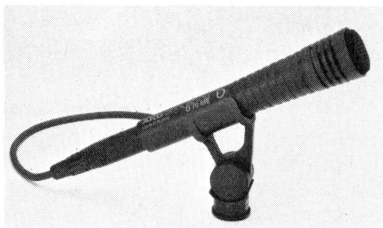
For more information on the APAS System, contact Comprehensive Video Supply Corporation at 1-800-526-0242 or in New Jersey 201-767-7990.

VDO-Pak Products has introduced a new adapter for its Ni-pak Jr. nickel-cadmium battery which enables the battery to simply snap on the back of a Matsushita-type VHS camcorder and increase the unit's actual record time by an hour. The two-piece adapter,

called the CA-100, consists of a precision molded plastic plate and "key" that mates with the Ni-Pak Jr.'s standard belt-loop fitting and allows the battery to snap securely to the camcorder's own battery mount.

By using the CA-100 and the Ni-Pak Jr., a videographer can get up to three hours of actual camcorder recording without resorting to standard out-board battery packs which require dangling cords or cumbersome shoulder straps. The battery neatly and firmly snaps to the camcorder, retaining the unit's self-contained construction, and a short portable adapter cable connects the battery to the unit.

For further information, VDO-Pak Products, 164 Howes Street, P.O. Box #67, Port Orange, FL 32029-0067. (800) 874-5906.



AKG Announces New, Low-Cost Microphone

AKG Acoustics has introduced a new, competitively priced dy-

namic microphone, the D-70ME.

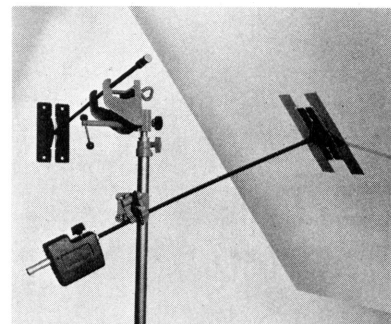
This medium impedance (200-1000 ohms) cardioid pattern mic is equipped with a 3-pin XLR connector, and has a wide range of applications. It's ideal for the home recording enthusiast, while its sturdy construction makes it rugged and road-worthy when used as a vocal or instrument sound reinforcement mic.

As part of a pre-market field test, AKG put the D-70ME through its paces; testing its performance in many areas.

Its 128 dB Maximum Sound Pressure Level (SPL) allowed the up-close placement necessary for successful instrument or amplifier micing, while its proximity effect delivers warmth and body to any vocalist.

Smartly finished in matte black, the D-70ME also incorporates a built-in pop-screen and comes complete with an SA-40 Mic Stand Adapter.

For further information contact AKG, 77 Selleck St., Stamford, CT 06902. (203) 348-2121.



Light Reflector

The Lowel Maxa-mount offers a simple way to turn large, lightweight foamcore and other types of panels into effective, controllable light reflectors for video, film and still photography, both in the studio and on location. Not only panels, but also props and products to be photographed can be quickly secured with tape, or permanently, with bolts.

The device has complete pan, tilt and rotational adjustability when mounted with a Lowel Lobo, Lowel Grip or conventional gobo head. For those floating-in-air "limbo" product shots, the stand can be hidden behind seamless paper with a hole cut out for the Maxa-mount shaft.

continued



K800 with Film Scanners 16/35mm

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THE K800/4- or 6-PLATE-TRANSFER TABLE can be supplied with scanners for 16 or 35 mm for the transfer of picture and sound to video.

The K800 allows the transfer at any pre-selected speed between 1–150 f.p.s., making special effects such as fast and slow motion and freeze frame possible.

The new construction of the 24-sided hollow prism-style (KemScope) is the basis for perfect scanning on a prism-system. The image quality is like professional TV-cameras. A variable mirror housing and camera-console permits the use of different TV-cameras.

Special features:

- colour mixing head
- interlock capability with other studio-equipment
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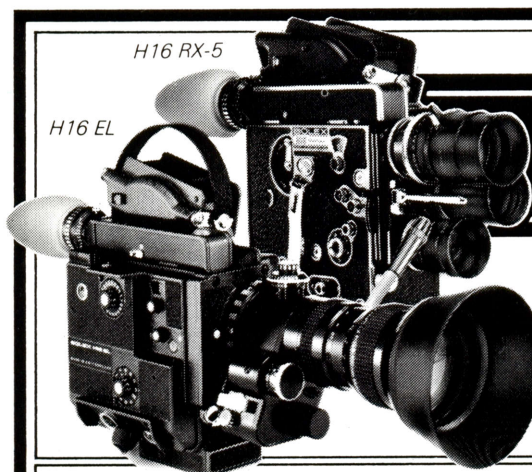
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If balance needs to be improved, a Lowel Weight can be locked onto the Maxa-mount's 5/8" stud. The stud can be removed in order to insert the shaft into the 3/8" umbrella receptacle on many strobe heads.

For further information, please contact Lowel Manufacturing, 475 Tenth Ave., New York, 10018. (212) 947-0950.



Video Camera Support Cart

Innovative Television Equipment (ITE) announces the availability of the new ITE-EFP2 - an extremely stable and rugged camera support cart in a compact and lightweight design that is ideally suited for television field production.

The ITE-EFP2 cart features spacious storage - including a semi-enclosed compartment for a 12V battery, a VTR shelf, and a top shelf for a large monitor. Each shelf contains retention straps and no slip surfaces. The rigid camera quadpod features a 7-inch, positive cam lock height adjustment and a "pro" leveling bowl. When equipped with the appropriate ITE Fluid head, the new ITE-EFP2 cart will provide stable support for EFP camera systems weighing up to 30 lbs.

Constructed of heavy gauge aluminum tubing, the ITE-EFP2 cart

weighs only 38.5 lbs (17.5 kg). With handle and pod removed for transport, the cart is a compact 30" high x 22-1/4" long x 18-3/4" wide. It is priced at \$1185. Also available is the ITE-EFP1 (without quadpod and leveling bowl) which is priced at \$1015.

For further information, contact Innovative Television Equipment, 6445 DeSoto Avenue, Woodland Hills, California 91367. Tel: (818) 888-9421.



New Lightweight Case

OpTex has added a new lightweight carrying case to an itinerary of top quality soft equipment cases. Specially designed for the Sony BVW-25P Betacam recorder, the case is made from tough waterproof Cordura, padded with high density foam, which provides excellent protection from knocks and bumps and of course the weather.

Access to the tape and battery compartments is provided by flaps on the front and side of the case. A velcro fastened top flap with built-in viewing window folds back to allow easy insertion and removal of the machine and access to the controls.

Cables are fed in through a weatherproof side vent. One side pocket and two front pockets provide storage for spare tapes, batteries, radio mike and cables. The case comes with a strong, comfortable webbing shoulder strap.

For more information contact: OpTex, 22-26 Victoria Road, New Barnet, Herts EN4 9PF, England Tel: 01-441 2199

New Super 8 Camera

Super8 Sound introduces the new line of Beaulieu 7008 Super 8 cameras. In keeping with Beaulieu's tradition of excellence, the new 7008S and 7008 PRO cameras are in a class by themselves. Similar in design to

continued

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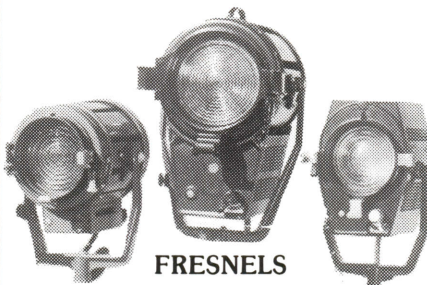
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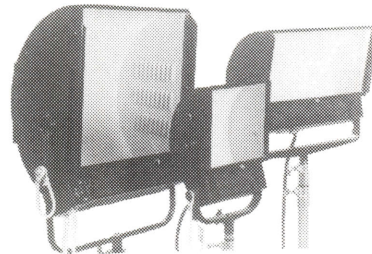
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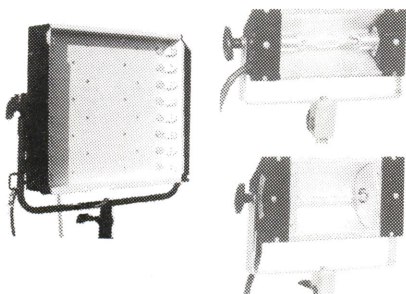
QUALITY doesn't have to cost more, as some of the TV networks and Hollywood studios have found out.



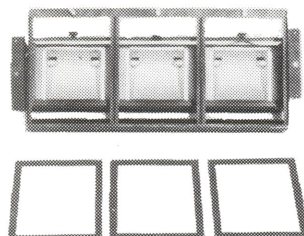
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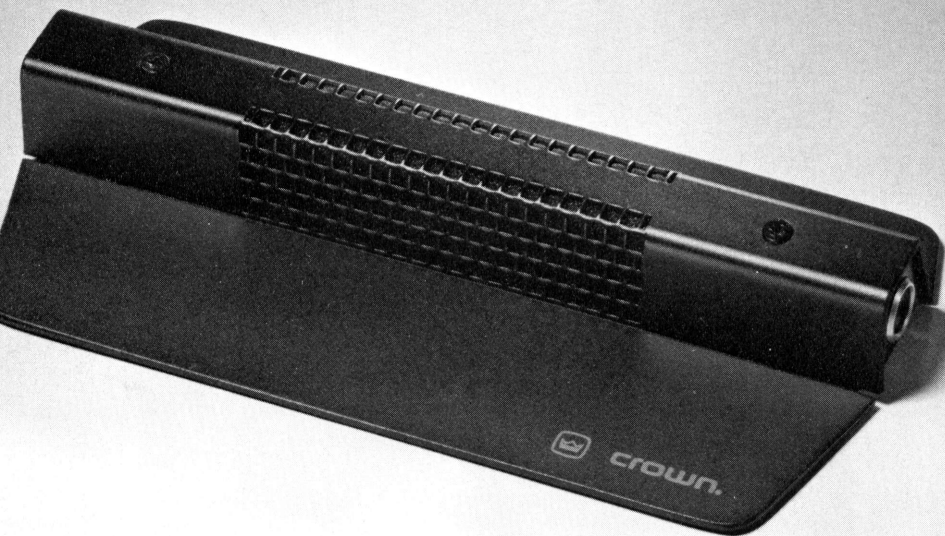
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Introducing the PCC™160 Phase Coherent Cardioid™ from Crown.

Designed for easy mounting on a boundary surface, the PCC-160 utilizes a sub-miniature supercardioid mic capsule to create a directional pattern which im-

proves gain-before-feedback, reduces unwanted room noise and rejects sounds from the rear.

For stage reinforcement, podiums, news desks, or for hiding in sets, the PCC-160 offers superior performance.

And because the microphone is mounted on a boundary, direct and reflected sounds arrive at the diaphragm in-phase. The result...wide, smooth frequency response free of tonal coloration or unnatural sound which can occur with conventional microphones.

Self-contained electronics eliminate the need for a sometimes awkward in-line preamp box. The PCC-160 can be powered directly from the console or other remote power source. Or if battery power is convenient, a battery supply unit can be inserted anywhere in the mike line...right up to the console or mixer.

For maximum flexibility, the PCC-160 features an exclusive three-way "bass tilt" switch which allows you to tailor, up or down, the low-end response for special applications or unusual boundary sizes.

Due to its low profile and "go away gray" finish, the PCC-160 microphone becomes nearly invisible in use, making it ideal for the stage, newsroom or lectern top.

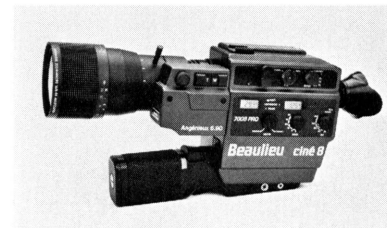
But beneath its cloak of dark gray, the PCC-160 is protected by a heavy-gauge, all-steel body, tough enough to stand up to even the most severe abuse.

The PCC-160. A microphone meeting the needs of today's sound professional with today's most advanced technology.

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Call or write for more information and complete specifications.

16mm cameras, with such professional features as mirror shutters, ground glass focusing, interchangeable C-mount lens, frame counters, and a crystal sync camera control, the new Beaulieu 7008 cameras firmly establish Super 8 as a professional production format.



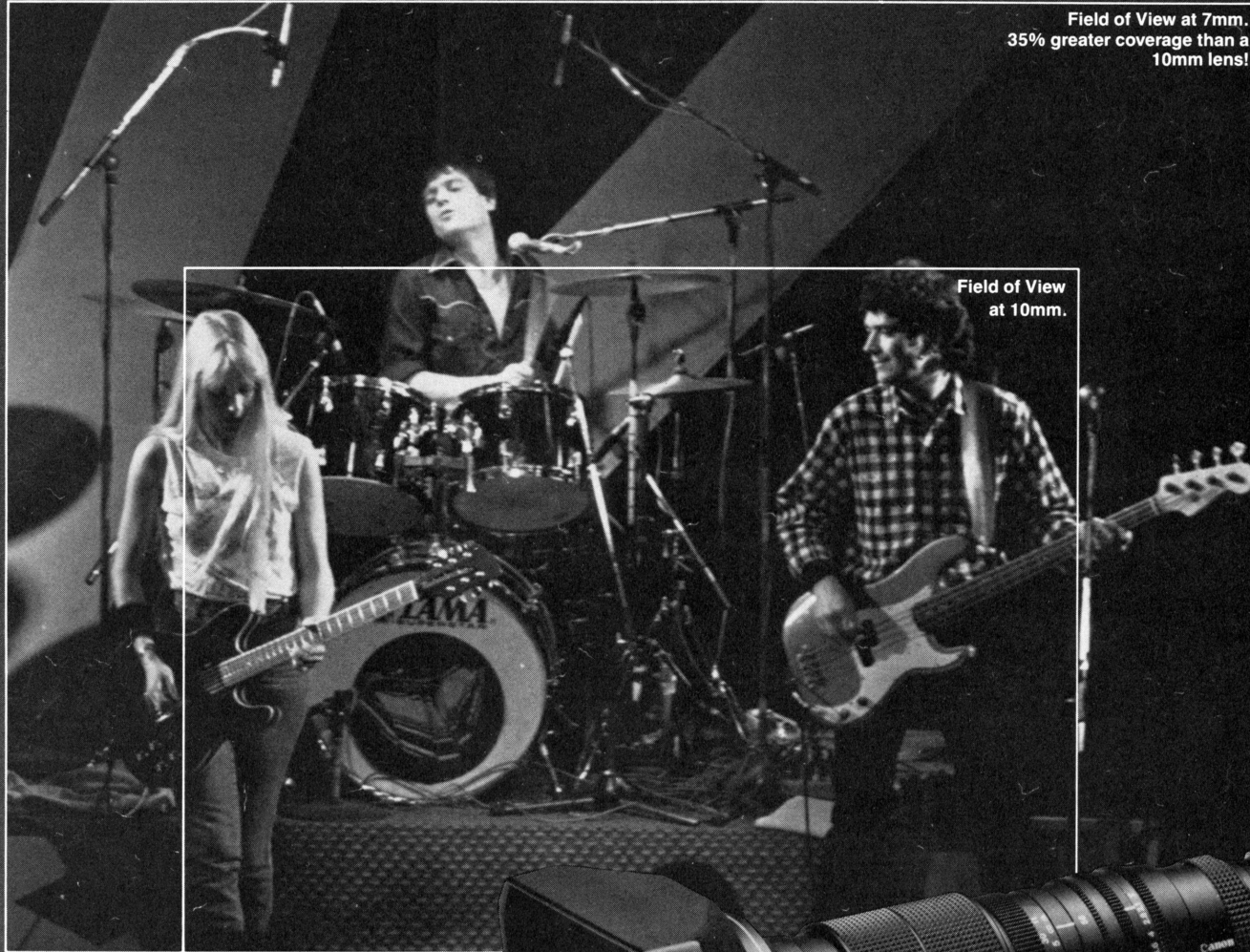
Beaulieu's choice of a lens for the 7008 cameras is the excellent f1.4/6-90mm Angenieux, with multi-coating for excellent color rendition, and a unique macro focusing capability that enables focusing down to two feet at any focal point in the lens's normal range (6mm to 90mm). The Angenieux also features a variable speed motorized zoom that will travel the 15:1 range in from 4 to 10 seconds, and a quick zoom button. The interchangeable C mount of the 7008 cameras offers the option of using a full complement of 16mm fixed focal point prime lens, or mounting the 7008 on microscopes, telescopes, or anywhere a 35mm SLR camera can be mounted for research applications.

Featuring Beaulieu's patented "Hal Sensor" system, the 7008S features excellent sound on film recording. For complete freedom and mobility while shooting double system, Beaulieu has built a professional silent model of the 7008, the 7008 PRO, with a crystal sync camera control. The 7008 cameras feature film speeds of 4, 9, 18, 25, 36, 56 fps, or 80 fps. They accept the Kodak 200' sound cartridge. The 7008 cameras also feature single-frame capability and a built in intervalometer that will expose one frame per second, one frame per 10 seconds, or one frame per 30 seconds. The 7008 will run on rechargeable nicad batteries or alkaline batteries, and can be remotely powered by a 9v battery pack.

For more information contact Super8 Sound, 95 Harvey St., Cambridge, Ma. 02140. △



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35% greater coverage than a
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Field of View
at 10mm.

The Textones, photograph by Gary Nichamin.

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The crowd has you pressed up against the stage. You shoot a close-up of the lead singer, zoom out to catch the entire band, and finally turn to come in tight on the expressions of the crowd two feet away. All in one shot. Impossible? No. Now there's the versatile new Canon 7-56mm zoom.

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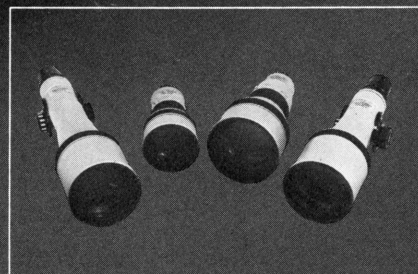
Photometric Aperture: T2.1

Format: 16mm

Minimum focusing distance from image plane: 24" (.6m)

Object Angular Field: 72.5° at 7mm.

Weight: Less than 3 lbs. (1.3kg.)



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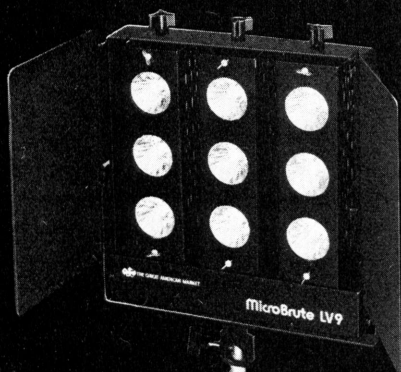
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The Bookshelf

by George L. George

Yugoslavia's cultural diversity is reflected in the changing currents of its film production. Daniel J. Goulding's **Liberated Cinema** follows these developments in a detailed study of leading Yugoslav movies of the last four decades, and the political and artistic forces that shaped them. In **Bulgarian Cinema**, Ronald Holloway describes Bulgaria's distinctive films stemming from rich national folkloric traditions and dealing inventively with social and cultural concerns (*Indiana U. Press, Bloomington, IN, \$25; Fairleigh Dickinson U. Press, Cranbury, NJ, \$30*).

In **Spanish Film Directors**, Ronald Schwartz profiles 21 filmmakers, whose work thrives on newly-won freedoms, and assays the personal styles of such directors as Carlos Saura and Juan Antonio Bardem. In **The Cuban Image**, Michael Chanan surveys the historic evolution of Cuba's film production, its path during the last 25 years, and its vital role in the cultural revolution that reshaped the country (*Scarecrow, Metuchen, NJ, \$20; Indiana U. Press, Bloomington, IN, \$35/12.95*).

Writings by Dziga Vertov, pioneer Soviet documentary director, are collected by **Kino-Eye**, edited by Annette Michelson. Articles, manifestos, speeches and letters describe with revolutionary fervor his innovative approach to a cinema that blends technique with ideology (*U. of California Press, Berkeley, \$35/9.95*).

In **Portraits of the British Cinema**, John Russell Taylor and John Kobal assemble some 150 exceptional portraits of the country's brightest stars of the past 60 years. The book praises their contribution and inventories their films (*Merrimack, Topsfield, MA, \$22.95*).

Alec Guinness's delightful memoir **Blessings in Disguise** and Hollis Alpert's distinguished biography

Burton record careers of two equally remarkable actors and the profound contrast between Burton's flamboyant, larger-than-life personality and Guinness's diffident gentleness (*Knopf, NYC, \$17.95; Putnam, NYC, \$16.95*).

In **Hollywood Destinies**, Graham Petrie considers the fate of many European directors, lured in the wake of WWI by Hollywood studios to bring their artistry to U.S. films. Among them were Germans Lubitsch, Murnau and Leni, Swedes Stiller and Seastrom, and Hungarian Fejos. Their careers and their impact on American cinema are knowledgeably discussed in this perceptive study (*Routledge & Kegan Paul, Boston, \$29.95*).

French expertise in matters of love is well demonstrated in **Sex on the Screen**, a widely researched and explicitly illustrated survey of eroticism in film by French film critic Gérard Lenne. The international scope of the genre, its characteristics and its evolution are abundantly documented in this stimulating study (*St. Martin's, NYC, \$14.95*).

The 1985-86 edition of **Credits**, a serviceable 3-volume reference source of motion picture production personnel compiled by Debbie Brenner and Gary Hill, covers a selection of over 900 English-language films released since 1979. Vol. 1 carries an alphabetized list of films, cross-indexed in Vol. 2 by production firms, and in Vol. 3 by individual technicians (*Magpie Press, Wallington, NJ, \$75/set + \$3.50 handling*).

A selective compilation by Elkan Allan, **A Guide to World Cinema** lists alphabetically some 7,200 features, shorts, documentaries and made-for-television movies produced since 1950, including capsule reviews and essential data for each entry (*Gale, Detroit, \$125*).

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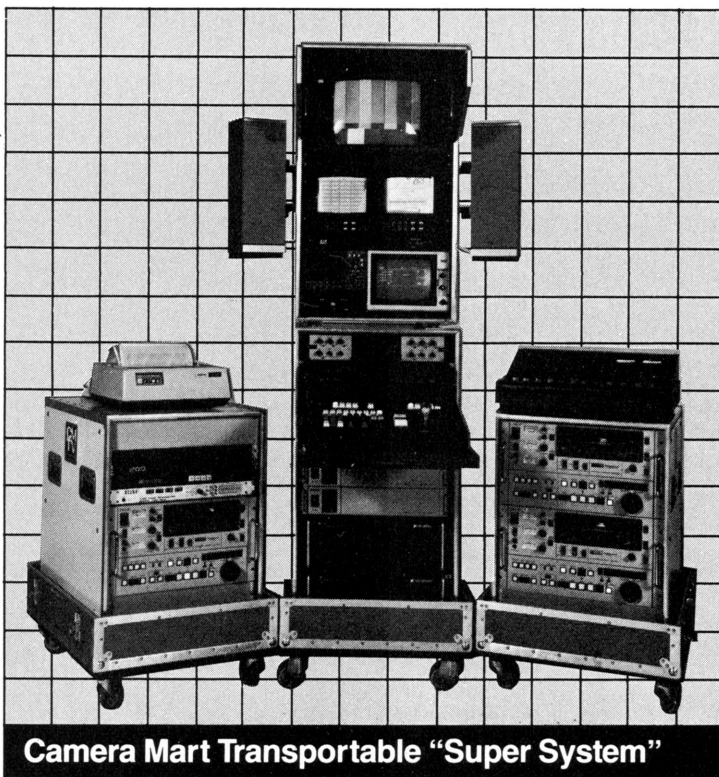
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The Editor is supported by two TBC's, time code, dual floppy disk drives, high-speed printer, switcher, and audio mixer. Monitoring includes dual 8-inch color monitors, one 12-inch color monitor, wave-form monitor/vectorscope, data display monitor, and 2-channel audio system. All permanently mounted and pre-wired.



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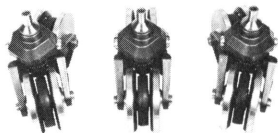
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In The Film Catalog: A List of Holdings in The Museum of Modern Art, MOMA's rich film collection is expertly inventoried by Jan Gartenberg. It encompasses some 5,000 films from the 1890s to the present, representing the full spectrum of cinema art. The catalog is conveniently organized, fully cross-indexed and selectively illustrated (*G.K. Hall, Boston, \$60*).

An invaluable reference source of the entertainment world, **Contemporary Theatre, Film and Television** carries over 1,800 entries of creative artists and technicians, with personal and educational statistics, and extensive career summaries. Ably edited by Monica O'Donnell, it succeeds "Who's Who in Theatre," retired after 72 years of publication (*Gale, Detroit, 2 vols. \$90*).

Raymond Fielding's authoritative **The Technique of Special Effects Cinematography**, now in a thoroughly revised 4th edition, surveys all current visual effects. Detailed and clearly written, with appropriate illustrations, it describes significant advances in standard processes especially front projection, traveling mattes and the use of computers and motion-control hardware (*Focal Press, Stoneham, MA, \$24.95*).

Gregory A. Waller's extensive study of vampires in film and literature, **The Living and the Undead** stretches from Stoker's *Dracula* to Romero's *Dawn of the Dead* in its search for the fearsome monsters that fascinated generations of faithful fans (*U. of Illinois Press, Champaign, IL, \$28.95*).

Film encyclopedist Leslie Halliwell evokes in his amiable memoir, **Seats in All Parts**, his youthful enthusiasms for the movies. Stimulated by a sensitive and inquiring mind, this early commitment blossomed into a sure artistic taste and rigorous critical standards (*Scribners, NYC, \$15.95*).

A montage of facts and gossip, Peter Harry Brown's **Kim Novak: Reluctant Goddess** makes more of her life and career than the selected episodic incidents warrant (*St. Martin's, NYC, \$16.95*). △



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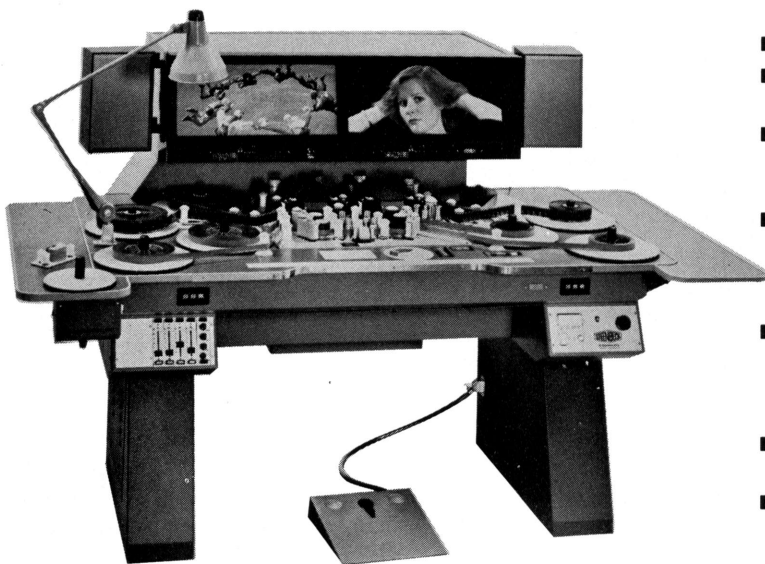
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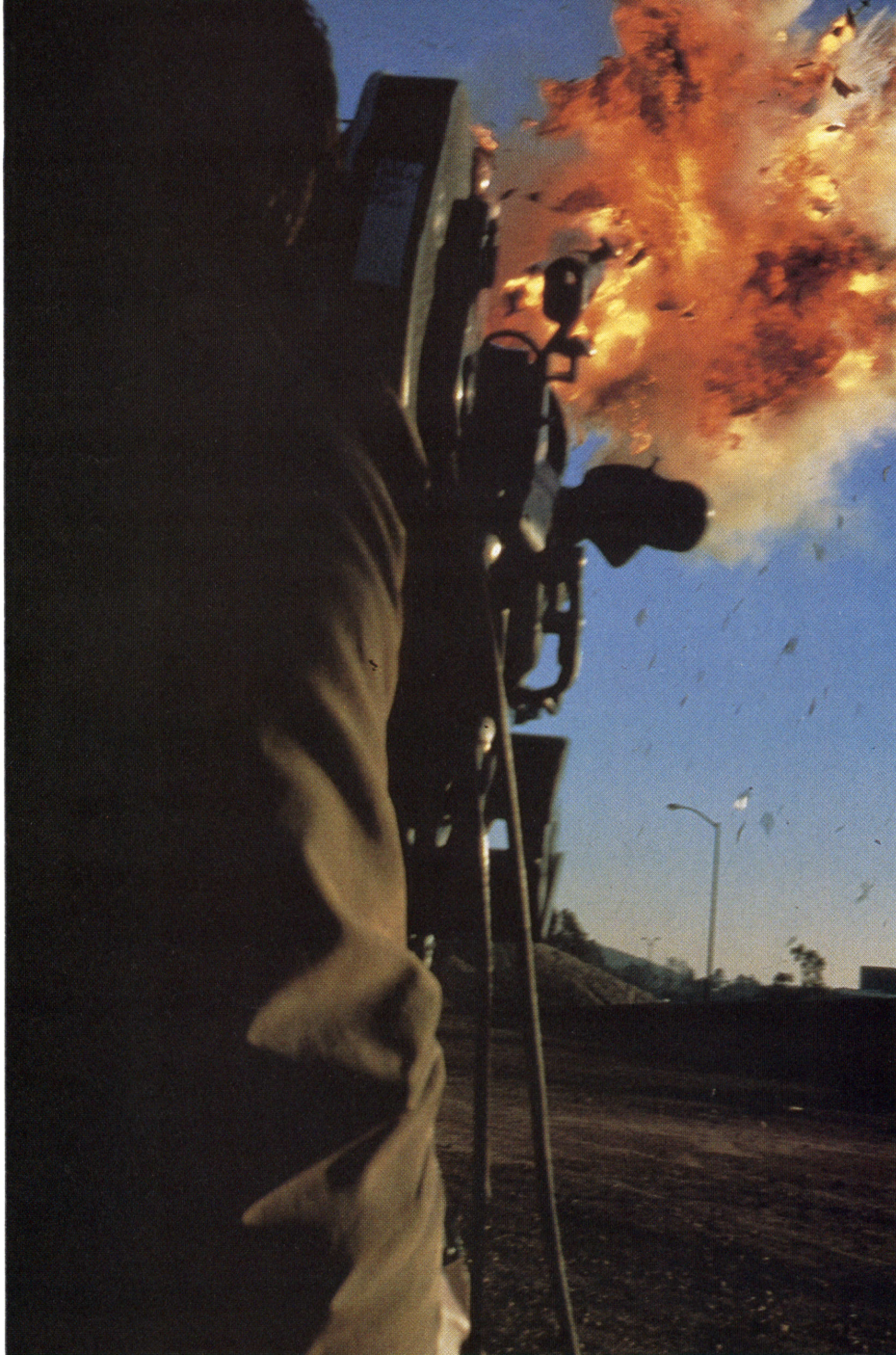
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Miniatures, Pyrotechnics for *Top Gun*

by George Turner

It's hard to find a fighter pilot willing to put his aircraft into a flat spin, and the U.S. Navy is resistant to the idea of blowing a multi-million dollar aircraft apart for the sake of a movie shot. That's why the ultra-realistic aerial drama, *Top Gun*, was augmented with startling scenes of jet planes exploding and crashing which were filmed with scale models. Like the actual aerial photography which is featured throughout, these visual effects scenes convey an impression of stark reality.

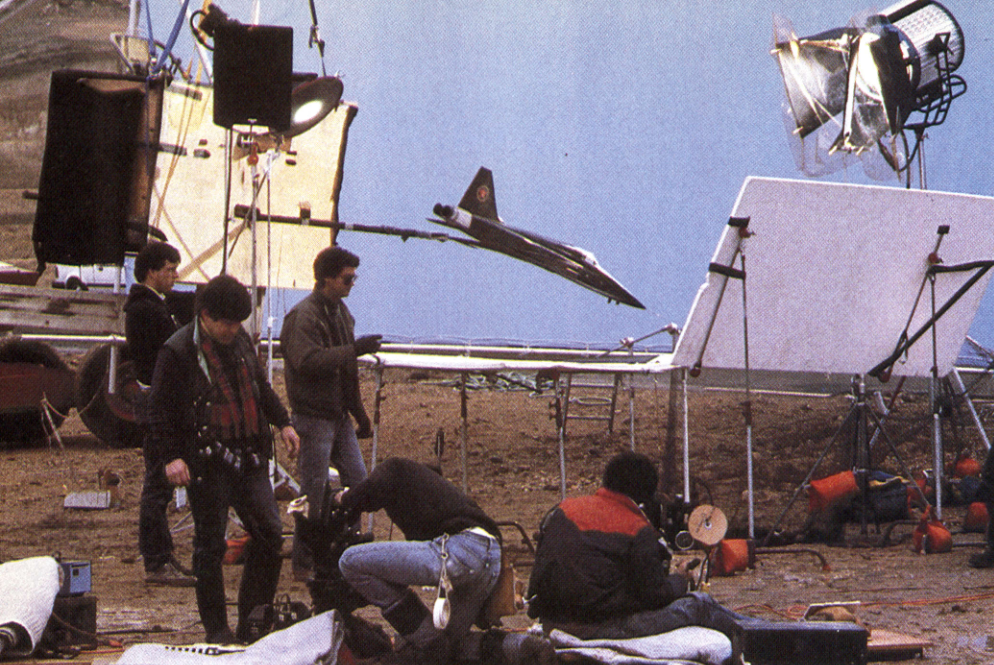
The British director of features and television specials, Tony Scott, realized that a single "phony" effect shot would invalidate all the good scenes that were being made with the help of the Navy. He sketched out his ideas and sent them to the company which had done the sort of work he needed: USFX, of San Francisco, a subsidiary of Colossal Pictures. He had seen their work in the most realistic of space dramas, *The Right Stuff*.

Gary Gutierrez, creative director at USFX, and a fine storyboard artist in his own right, was fascinated. "In this case, Tony Scott, who has an art background, sent me little thumbnail sketches of what he wanted. Storyboards are a good way to communicate with everybody and get down your ideas. Tony is visually articulate, he knows what he wants, and he's a perfectionist. His being able to draw made it easy for us to communicate. We'd take his sketches and put them right into our own boards." It made for a good relationship, and the results are stunning.

Gutierrez has that rare combination of artistic and technical aptitudes that go into the makeup of the better visual effects experts. He was born in Atlanta, March 23, 1947, the son of a career Air Force man and a nurse. He studied art at the University of Nevada and the San Francisco Art Institute, in the meantime learning the fundamentals of filmmaking through self study. With a Bolex 16mm (purchased on time payments) he made a documentary



Opposite page:
 Director of
 photography Rick
 Fichter catches a
 fiery explosion on
 film while the
 camera is
 deliberately vibrated
 by a power drill.
 Above: Two manlifts
 and a forklift keep
 the action high
 enough to permit a
 clear shot against
 the sky. Left: The
 USFX crew stands
 by in fireproof gear
 manning hoses and
 extinguishers as a
 foot F-14 crashes.
 The three smaller
 pictures show
 highlights of an
 explosion as
 captured by high-
 speed cameras.



Above: Special rigging is necessary for a shot involving a model MIG fighter plane. **Right:** Highlights of another napthalene and black powder explosion.



about a San Francisco street preacher, *Brother Jim*, and changed his major to film. Through the honors system he was awarded an apprenticeship with Korty Film, where he remained for five years as an animator and co-writer for the "Sesame Street" and "Electric Company" TV shows.

In 1982, Gutierrez was asked by Philip Kaufman, producer for Warner Bros. and the Ladd Co., to storyboard *The Right Stuff* and next was hired to create the visual effects for this highly realistic film about America's space program. USFX maintains a basic staff of about a half-dozen persons, but expands accordingly when a large project comes along. The company has its own model shop, stage, blue screen facilities and several motion control systems.

Some of the key personnel assembled for the *Top Gun* job were Rick Fichter, director of special effects cinematography, another veteran of *The Right Stuff*; Whitney Green, producer and production manager; Bill Groshelle, animation director; David Sosalla, model supervisor; George Merkert, art production manager; Peter Thomas, in charge of sets and props; Peter Stoltz, pyrotechnics supervisor; Stacy Foiles, Richard Childs and Billy Webber, editors; camera operators Steven Lighthill, John Else, Hiro Narita, David Hallinger, Peter Williams and Melissa Mullin; and animators Sam Comstock, Wes Takahashi, Stuart Cudlitz, Loring Doyle and Katie Rauh.

The Right Stuff taught Gutierrez many lessons, one of which was that if an object is supposed to fall, it is sometimes better

to let it fall rather than to move it on a track.

"With *Top Gun*, we picked up where we left off on *The Right Stuff*," Gutierrez said as *Top Gun* was reaching the post-production stage. "We had a body of knowledge from having dealt with so many eccentric setups and that gave us a leg up on *Top Gun*, which was a notch more difficult because pyrotechnics were involved. We had helium balloons, wires, and even a World War II PT boat camouflage rig to create clouds on the ground. We could create really dense high clouds right on the ground and we could run out planes through these.

"We have a philosophy that we always do what is appropriate to the job, and we have everything, basically, to play with these days. We use motion control when it's appropriate and use other kinds of practical effects that sometimes haven't been combined before. Motion control is wonderful, but it's sometimes misapplied. On *The Right Stuff* we found that it was perfect for Glenn's capsule in space, and we used it for that. The shots of airplanes that we made in motion control, however, had a stiffness that would never intercut convincingly with shots of real planes and real POV footage and be believable. Besides, when the model is free such interesting things happen that you'd never think to program. It was a matter of matching the photographic and stylistic requirements of the film."

The miniatures were photographed in Super 35 using Arriflex III cameras for the most part. Action was photographed at various camera speeds up to 300 fps. "We only used the speed charts as a general guide," Gutierrez noted. "We used different speeds for various desired effects." The models included three nine-foot planes, three six-footers, and a great number of smaller models of varying size. There were two weeks of tests and three-and-a-half weeks of actual shooting.

Much of the work was done on a hilltop in Oakland which had been cleared and partly

developed for a housing project. "We made a deal with the developer because it was ideally situated," Gutierrez explained. "We needed a graded off area that didn't have any grass or structures that could catch on fire, and it gave us a good fire brake. And we needed a 360° view of the horizon so we could take advantage of short winter days. We had only eight hours of sunlight, and we were able to shoot right up to 4:30 any day.

"We had rain insurance. It rained right up until the first week we shot, and then we had three solid weeks of the clearest weather and it only began to rain again on the last two or three days. We couldn't have asked for better, and it's been terrible ever since." The photography was done during December and January.

An 80-foot manlift tower was erected on the hilltop. Smaller lifts were used for camera positioning. A large blue cyclorama was utilized as a sky substitute when it was necessary to shoot on gray days. The 80-foot tower was the launch platform for a great variety of aircraft models with wingspans ranging from 18 inches to nine feet.

"We had some six-foot and some nine-foot models for the shots of the F-14 Tomcats falling out of the sky, having supposedly been crippled by missile fire from the enemy MIGs," Gutierrez recalled. "In one case a plane goes into a flat spin and we see it falling, falling, falling – kind of like a leaf – in a slow turn. In the first instance, where a MIG blasts a Tomcat out of the sky and a big flaming chunk of it is falling down, we used a nine-foot model launched from a ramp on top of the 80-foot tower. Peter Stolz, the pyrotechnician, and Peter Thomas, the gaffer, were up there. It was pretty scary when the wind would get to blowing. They would ignite the things and get it going. We usually had three camera positions following it, all hand-held in documentary style. We had placed a net below to catch the planes, but they didn't always hit the net.

"We had back-up planes – three of the nine-footers, for example. We were actually able to repair them and re-use some of the same ones – of course, they were supposed to look a little beaten up. Pete Stolz used black powder and naphthalene to create the explosions. To keep the tower out of the scenes we'd position the cameras so it was at the edge of the view and then we'd follow the airplane off away from the tower. We had bungi cords with a lot of tension to kick the planes out."

In some scenes the camera was rotated on a special rig resembling a spit, to add to the chaotic motion of the scenes of falling aircraft. Another touch that added realism to the scenes was the deliberate vibrating of the cameras during explosions, which was done with the jarring action of power drills.

"Tony Scott wanted some scenes where the planes fall from a great distance and come right at the camera," Gutierrez noted. "We put Peter Thomas up on the tower. We'd already been placing bets on whether the planes would fall into the net or miss it. This time Rick Fichter yelled to Peter that he'd give him ten bucks if he could hit the lens with a plane sailed out from 80 feet. We had a piece of plastic to protect the lens and a six inch target area. The model was small, like an off-the-shelf 18-inch kit – 1/32 scale.

"Peter actually hit that target after six or eight tries! He just sailed it, like a frisbee. We did a lot of takes to get several good shots, but there were many other good shots that actually came within a few inches of the lens."

Pyrotechnics played a major part in the miniature action. Rockets were fired from the wing of a six-foot model. "One of the wing tips was wired through with little slide contacts so that the rocket would slide into a little slot and make a contact, then the wire would run out of the frame and we'd fire that remotely," Gutierrez said. "We were matting in optical wings sometimes and spreading

Process Projection Shots

Process projection shots showing the actors in their aircraft during battle scenes were utilized to augment the air-to-air photography. Last September, after the live action aerials were in the can, the *Top Gun* company flew back to Los Angeles for three weeks of filming studio sequences.

The projection process work was done inside a converted aircraft hangar at the Burbank Airport. The hangar proved ideal for the tremendous throws needed for rear projection.

Background 8-perf, VistaVision projection plates were photographed by veteran camera plane pilot Art Scholl. Scholl was killed during production while doing an inverted flat spin.

Because actors were severely limited within the cramped quarters of an F-14 cockpit, there were occasions when work had to be done on a gimbal. The gimbal, constructed by Alan Hall, included a full F-14 cockpit, complete with canopy and instrument panel, which could rock up and down, yaw, pitch and roll. Hall based his dimensions on the real life footage photographed one month before.

"When the jets roll, the sun appears to move around," director of photography Jeff Kimbell explained. "We took a 25-foot diameter light ring and stuck the gimbal in the middle, then whirled the light around at high speed to simulate the movement of the sun. We also used a Panatate which rotated a Panavision camera to obtain a 360-degree whirl. This gave us that added degree of motion needed by the taking camera so the shot didn't appear too static."

Bill and Don Hansard, projection specialists, coordinated the rear screen for the gimbal. The VistaVision plates were projected and re-photographed with the action in Super 35. The excellent copy ratio assured that the composite would mesh well with the original footage.

An emergency ejection scene was filmed while firing a dummy out of the mockup, backed by an explosive charge. On the first take, the mechanical effects coordinator put too large a charge inside and it blew the sides off the mockup.

—Les Paul Robley

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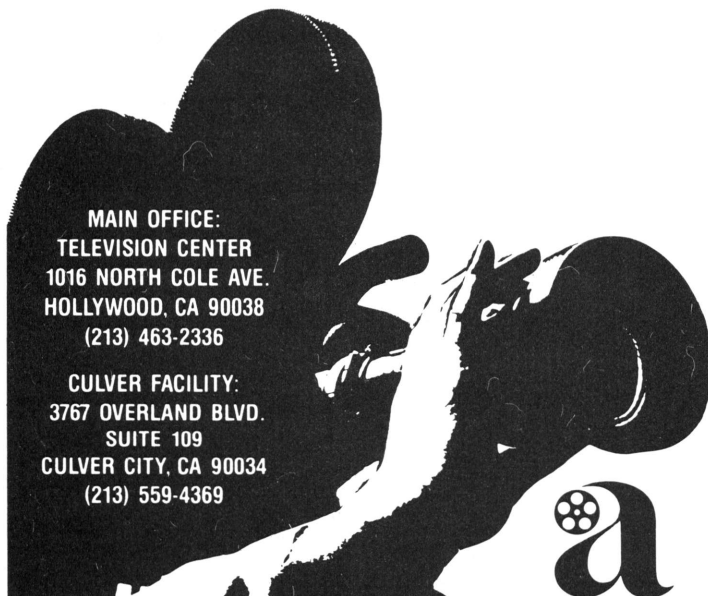
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them 'way out. The missiles firing off the wingtips were done with large scale pyrotechnics. And there were scenes where the tail blows off a plane, things like that. We used both hard wire explosions and radio controlled ones."

Another type of effect contributed by USFX falls under the general classification of "heads-up displays." According to Gutierrez, "That's where we were taking the aerial unit's shots and optically superimposing computer graphics in the foreground to show the audience what a pilot normally would see. You'll see some aiming devices, for instance.

"We were also doing tracer fire by using effects animation and opticals," he revealed. "Tracers are eccentric; they can't be done in the manner of *Star Wars* lasers - they make strange trajectories when they get out into the atmosphere; they aren't aerodynamic. We had done some tracer tests up on the hill and got some very encouraging results, but it wasn't allowing us the kind of variety and dynamics that we needed. Because of the way the planes moved throughout the shots, some of the shots that we did with pyrotechnic tracers, although they were actually very convincing, were limited in the way they could be used, so we animated them instead.

"It's very specialized animation," Gutierrez pointed out. "Sam Comstock and Wes Takahashi, our finest animators, are primarily responsible for that work. We had done some tracer fire on *The Right Stuff*, and we looked at a lot of documentary footage of planes flying as well as footage shot by the aerial second unit on *Top Gun* to analyze what kinds of things go into making a believable shot. Then we looked at old World War II footage of tracers and really analyzed what was going on in those shots and what was happening with the tracer bullets - the ways that they wiggle, how thick they were, and all the other things that make them look real. We took all those factors and used that as the philosophy of the animation."

Gutierrez was quick to note the difference in animation of this type as compared to the better known types of animation:

"Animation" conjures up the notion of a cartoon, but in this case it's a really specialized means to an effect. In the 'heads up display' we actually used the computer to simulate the motion of the target trying to find the plane. It was actually created as a computer motion control of the motion of animation graphics and then optically composited with the aerial photography. The tracer stuff also is on the background plates and must be animated to match that. You have to let the tracer sort of go out of the frame and put it through at odd angles.

"Incidentally, we don't do our own opticals," he added. "We have good working relationships with Cinema Research and Modern Film Effects. These are the two companies we work with."

The main principle that prevails at USFX is a striving for realism, almost of a documentary sort. After *The Right Stuff* was released, even veteran effects men were hard put to determine which flying scenes were real and which were created via miniatures. Gutierrez recalled, that "I'd tell people I produced the special effects and they'd say, 'What effects?'" Much of this was the result of a search for photographic touches that he calls "the subliminal visual cues of actual flight." *Top Gun* is filled with these cues: camera unsteadiness which suggests that the shot is being made from another aircraft; use of long lenses to capture a compressed, jumpy look we subconsciously associate with flying; the tendency of aerial cameramen under battle conditions to lead the nose of the subject plane and make hasty adjustments in composition; clouds (liquid nitrogen and fogger vapors) blowing through.

Despite the headaches that accompany any large effects job, Gutierrez said he enjoys them all: "I always learn something." △

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Doctor X—a Technicolor Landmark

by Scott McQueen

By their very nature horror movies have always been unorthodox, but none more so than *Doctor X*. The Warner Bros.-First National 1932 production was the first of the genre to be filmed entirely in color, yet it was also made in black and white. In modern times the color version was deemed to be irrevocably lost, but the vagaries of chance and some unconventional laboratory techniques have recently restored it to view.

Thanks to the wisdom of The University of California at Los Angeles and the skill of YCM Labs of Burbank, *Doctor X* has just been resurrected from the only existing color print, allowing

general audiences to see this legendary film in its original color for the first time in 53 years. The new print is as accurate as it is compelling.

Horror and mystery farces were all the vogue in 1928 when *Doctor X* came into being as *Terror*, a play by Howard W. Comstock and Allen C. Miller. The property was retitled in the wake of Edgar Wallace's *The Terror*. After opening in Great Neck, Long Island, on January 10, 1931, *Doctor X* rode the rails through Queens, Brooklyn and The Bronx before settling into Broadway's Hudson Theatre on February 9. Despite good notices, the show closed after 80 performances.

The phenomenal receipts of *Frankenstein* and *Dr. Jekyll and Mr. Hyde* were being appreciated when Warner Bros. bought *Doctor X* for \$5,000 in January, 1932. A tentative screenplay was written hurriedly by actor-writer George Rosener. It is labored and amateurish, but provided a novel concept in which the monstrous killer removes his disguise in such a way that he appears to be removing his own horrible head, pulling with it his torso and arms. The fright mask is of "synthetic flesh," a cure-all substance invented to replace diseased tissue. Earl Baldwin and Robert Tasker were set to work on a rewrite while Rosener was consoled by landing a part in the film as a ghoulish butler.

These two young men gave *Doctor X* gutsy, up to date rhythm and vernacular. Production chief Darryl F. Zanuck's story conferences ensured that this film would be a logical addition to a studio roster that had sported *The Finger Points* and *Five Star Final* the previous season; consequently *Doctor X* became a newspaper story. The reporter is the first character we meet. If he happens to encounter monsters and cannibals on his way, so much the better, but the film is about how he gets his story.

Under a full moon, reporter Lee Taylor prowls the New York waterfront for a story when the body of a murdered scrubwoman is delivered to the Mott Street morgue. Lee's hunch that it's another "moon killer murder" is confirmed when he overhears the eminent Dr. Xavier explain to authorities that this victim, too, has been strangled, mutilated with a surgical knife, and the flesh eaten. With all of the murders occurring in the vicinity of Xavier's medical academy, the killer is certain to be associated with the school. Xavier begs the police a grace period to trap the fiend himself, and arranges an experiment at his Long Island mansion. The academy's suspect faculty members view a re-enactment of the crime while their vital signs are monitored by the one-armed Dr. Wells (Preston Foster, above suspicion as forensics conclude the killer possessed two powerful hands). At the height of the experiment, with the room in darkness, Professor Rowitz (A.E. Carewe) is killed, his body later mutilated like the rest. A second re-enactment is staged with Xavier's daughter Joan. Xavier and the participants are shackled to their seats, but unknown to any of them the crippled Wells sneaks from the recording cabinet to a secret workroom where, amid bubbling beakers and crackling electric arcs, he fashions a living prosthetic arm and hideously distorted face from a cauldron of synthetic flesh, returning to the stage where Joan realizes with terror that she is acting out her own death. As the doctors struggle helplessly in their bonds, Lee, who is disguised as a wax figure, battles the monster, now possessed of hideous strength. The reporter is tossed about like a rag doll before he fells the creature with a kerosene lamp, sending it hurtling through a window and down a precipice in a ball of flames.

The doctors are conceived in swift, grotesque strokes. We learn that Wells is a



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student of cannibalism and first appears musing over a piece of flesh pulsing in a specimen jar and babbling about being that much closer now to the secret of life. Spying his muddy boots steaming on the radiator, the police are just about to snap on the bracelets when Wells nonchalantly pulls his artificial arm out of his coat sleeve. "Shall we be going, gentlemen?" inquires Dr. Xavier of the stupefied detectives (a sublime, extempore line that appears nowhere in the script), "There are many other interesting things to see!"

Duke (Harry Beresford) is a distasteful old cripple, spouting invective and doom from his wheelchair. Rowitz has "the air of an ex-German officer . . . horribly marred . . . he has lost one eye and wears a smoked glass monocle to cover the empty socket. He *couldn't* be the killer," insists Dr. Xavier. "Why, he's the author of several volumes of poetry!"

Dr. Haines' face "plainly shows traces of lust and sensuality." We first encounter him sheepishly disposing of a pornographic magazine. his salaciousness was toned down in the film as released with the deletion of a delightfully embarrassing scene (which *was* filmed) where Haines (John Wray) gets a little too friendly with the virginal Miss Xavier. "I've brought you something you'll enjoy," he drools, "A very old book of Japanese erotica." As Joan protests he opens the book and pushes it at her, gushing, "The drawings are a little naughty . . ." When Dr. X admonishes him for what is apparently not Haines' first lapse in sexual etiquette, he sighs that the doctor still misunderstands him.

Doctor X was given a start date of March 19th. Production Executive Hal B. Wallis brought all aspects of production on line even as the script continued to be refined. Lee Tracy, who origi-

Above: A typically angular closeup of Arthur Edmund Carewe from Ray Rennahan's *Technicolor* camera. Richard Tower used a lower angle in his black and white version. **Opposite:** George Rosener, John Wray, Lionel Atwill and Fay Wray attend a dazed Lee Tracy in one of Anton Grot's distinctive sets. (Frame enlargements in this article are made from the two-color nitrate original, prior to scratch removal operations).

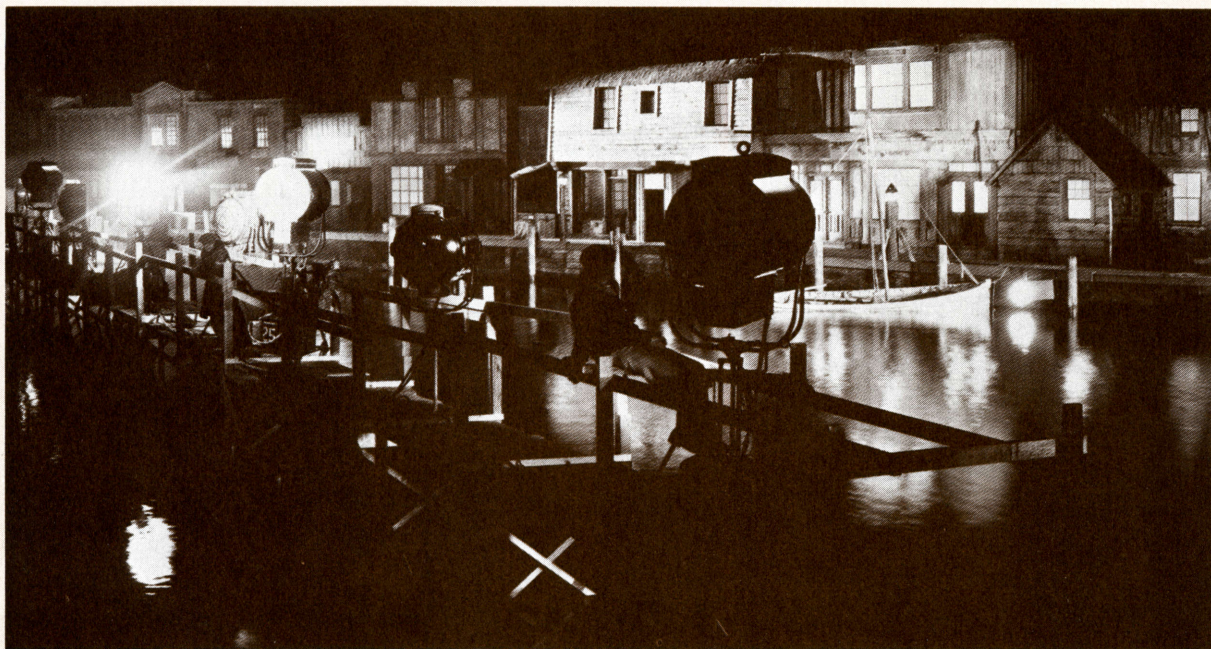


Photo by Scotty Welbourne

nated Hildy Johnson on Broadway in *The Front Page*, had made a career with the persona of the wise-cracking reporter. He had just played the role again for Warners in *The Strange Love of Molly Louvain* under Michael Curtiz's direction. That the screenplay calls him Lee Taylor indicates that the part was expressly slanted for him. Lionel Atwill was signed for the pivotal role of Dr. Xavier on March 2nd, at \$2,000 a week with a four-week guarantee. By March 9th, Fay Wray had joined up as his frightened daughter, little presuming the further horrors awaiting her in June on the RKO stages which would send her screaming headlong into American folklore.

Doctor X was one of five films that Hungarian-born, malaprop-prone Michael Curtiz directed for Warner Bros. in 1932. Perhaps it is the movie of which he is reputed to have said, "This will make your blood curl!" He was a driven, hard-working professional who expected his cast and his crew to possess his own vast stamina. He was particularly brutal with actors, for whom he had no sympathy in spite of (or because of) having been an actor himself. *Doctor X* is from his most energetic and interesting period.

Zanuck specifically changed and built up whole sections of dialogue and his conference notes indicate a careful consideration of the story's strengths and weaknesses. Since no actual murders are to be shown anywhere, a display of wax figures representing the fiend's victims was added to the play within the play, allowing the re-enactment to take on a ghostly quality as the inert forms of the moon killer's victims stand mutely over his final attack.

Doctor X was planned for Technicolor as Warner Bros. assumed that the strange hues of the two-color process might be an asset to a strange story and at the very least couldn't harm the

receipts of a cresting genre. The writers even included color descriptions in the screenplay. The studio was still working off a long-term contract for the process, having over-booked with Technicolor as early as April 1929 in an attempt to monopolize color as an exclusive ally for the Vitaphone. In their haste Warners was saddled with these non-cancellable contracts at a time when the public's desire for such color as Technicolor then offered had expired. By 1932 Technicolor had a practical three-color system ready but they were being cautious about launching it. Warners was still obliged to finish up their two-color contract, especially as a non-refundable deposit of \$25,000 had been plunked down for each proposed feature.

It was decided that color prints would be used for the domestic issue only, as Technicolor had no facility abroad in those days to manufacture prints. With color prints more expensive than black and white, and considering the added cost of freight and duty, shipping several hundred release prints overseas made little sense. So while Ray Rennahan, ASC, was assigned as color cameraman it was decided that Richard Towers, ASC, would man a second camera unit to photograph a black and white negative for foreign markets. Rennahan, a veteran cinematographer who specialized in Technicolor work, received sole credit on the color version. Towers, credited alone on the black and white titles, had recently been promoted to first cameraman at Warners.

Rennahan's unit included W. Howard Greene (later ASC) as the second Technicolor cameraman and Thad Brooks as assistant. The color crew was solely responsible for lighting the sets; as black and white cinematographer, Towers was little more than a glorified operator, though he had to achieve his exposures by justifying with filters

or changing the aperture to get a proper black and white negative under Technicolor lighting. Most often both units shot side by side. If a setup was at all complicated, Technicolor would shoot first before Towers and his assistant, Carl Guthrie (later ASC) would move in the B&W camera and make their shots using Rennahan's lighting set-ups. The camera angles are noticeably different between the two versions. Rennahan's are more bizarre, being shot almost entirely from considerably above or below eye-level. Towers utilized similar high angle establishing shots, but generally kept the camera close to eye-level.

Filming began on Saturday night, March 19th. With an evening call the company worked through until dawn on the "Twinkletoes Street" set on the Burbank backlot. These scenes, the waterfront opening to the picture, were made with the Los Angeles river doubling for New York's East River, and were the only night exteriors. Monday morning the company began in earnest on the sound stage.

In 1932 there were no actor or craft unions in Hollywood, and the company could be kept as late as the producer or director demanded. March 21st, the company's first full day in studio sets, Curtiz tried to get a jump on his 24 day schedule (standard for all Warner production at the time) by knocking off four scenes in 18 set-ups. People weren't sent home until nearly 1:30 the next morning, having begun the day at 9:00 am. The rest of the first week was more humane, averaging ten-hour days in which an average of 14 set-ups and three minutes of screen time were achieved each day. By 7:00 each night, folks were on their way home. When Rennahan and Brooks were called back the night of Thursday, March 24th, after everybody else was dismissed at 6:45, some might have taken it as a sign of anxiety that they were falling off schedule. The two men worked until past 11:00 that night, lighting the set for the next day's work. But the next day they finished just past seven, and even on Saturday, wrap was called just after midnight.

The studios worked six-day weeks and Saturday was always open-ended since people could sleep late on Sunday without affecting a work call! Consequently everyone worked the equivalent of two full days and only got paid for one, particularly on Curtiz's jobs, since he was always trying to impress Jack Warner with his efficiency.

Any belief that Saturday's "light" 15-hour day was an indicator of things to come was mistaken as the 15-hour day became the norm during the second week. On Thursday, March 31st, the company shot for 17½ hours on three different stages in order to finish three sets and relinquish a number of actors from the payroll. Zanuck sliced five scenes from the script, a full day's work. The next day a rare late call was issued for 11 a.m., and everyone went home before 6:30 p.m.; far from being an act of charity, they were being kept fresh for a Saturday marathon. Saturday, April 2nd, the *Doctor X* com-



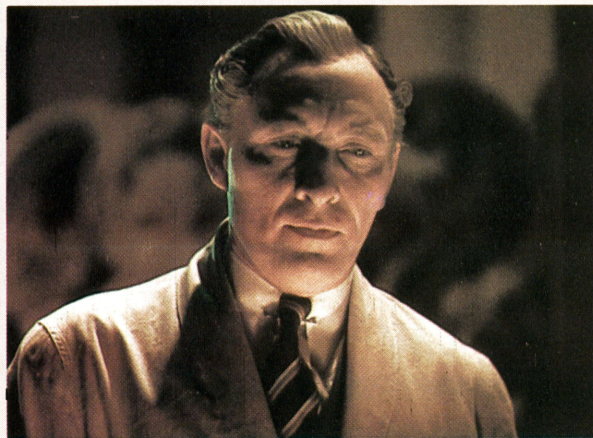
Above: Even with limited colors, Rennahan captured Fay Wray's unique beauty. **Left:** Atwill as the charmingly eccentric Dr. Xavier. **Below:** Color adds to the atmosphere of dread in closeups like this one of Harry Beresford. (Frame enlargements).

pany worked straight for for nearly twenty hours until almost five o'clock Sunday morning. It was a very productive day: Curtiz made 27 setups which accounted for seven minutes and 40 seconds of screen time – a tenth of the finished picture.

© 1932 First National Pictures Inc. © 1959 United Artists Associate Inc.



Frames from the Technicolor and black and white versions of the same scene show Atwill from different camera levels and angles.



Tuesday, April 5th, Rennahan and Greene stayed late again to light the lab set on Stage 7 and made Technicolor tests until 10:30 that night. This was important as the next eight days would be spent working this set. Dr. C. E. Warriner of the Glendale Bureau of Biological Research was a special advisor on the days laboratory and medical scenes were filmed.

By the fourth week the nine-hour day made a brief return, only to be replaced again by 15-hour days as the company achieved the remarkable average pace of 30 setups a day to complete the show. The climactic fight scene rolled on Thursday, April 14th, with augmented camera units. The master was lined up and rehearsed in the morning for an hour and filmed before lunch by four cameras. Rennahan and Green manned the color cameras while Towers and Guthrie, Ellsworth Fredericks (later ASC), and Ernest Haller, ASC, worked B&W cameras. After lunch Fredericks and Haller were replaced by William N. Williams (later ASC) and W. Robinson, who stayed with the extra B&W cameras until midnight. Floyd Lee came in for a full day as an extra Technicolor assistant. Six brief scenes contained in 1 1/4 script pages translated into 24 set-ups, a dozen of which were made in the 4 1/2 hours between lunch and dinner, implying that the four camera units switched off, one pair of color and B&W making a shot while the other pair prepared for the next one. All four units rolled again for the last shot of the day where the monster becomes a human torch. After one and a half hours setting up, the shot was a good one; one more was made for safety and the day ended just before midnight.

Tuesday, April 19th, found the company at Laguna beach filming a daylight love interlude between Fay Wray and Lee Tracy. They wrapped by 5:45 pm, once the sunlight was gone. Officially *Doctor X* was now a day over schedule, but the beach scene had always been planned to follow principal photography. An additional day was needed on the stage to tidy up. On Wednesday, April 20th, the company made a phenomenal thirty-eight set-ups by working all through the night. *Doctor X* wrapped at 6:00 am the next morning, two days over schedule.

Two process projection shots, several matte paintings and excellent miniature shots of the clifftop mansion (including one showing the fall of the flaming murderer) were added during post-production by Fred Jackman's special effects department.

With a heraldic main title composed by Bernhard Kaun, *Doctor X* was ready for release. Initial reaction at the studio was so enthusiastic that pre-production on a follow-up, eventually to become *Mystery of the Wax Museum*, was begun by late July.

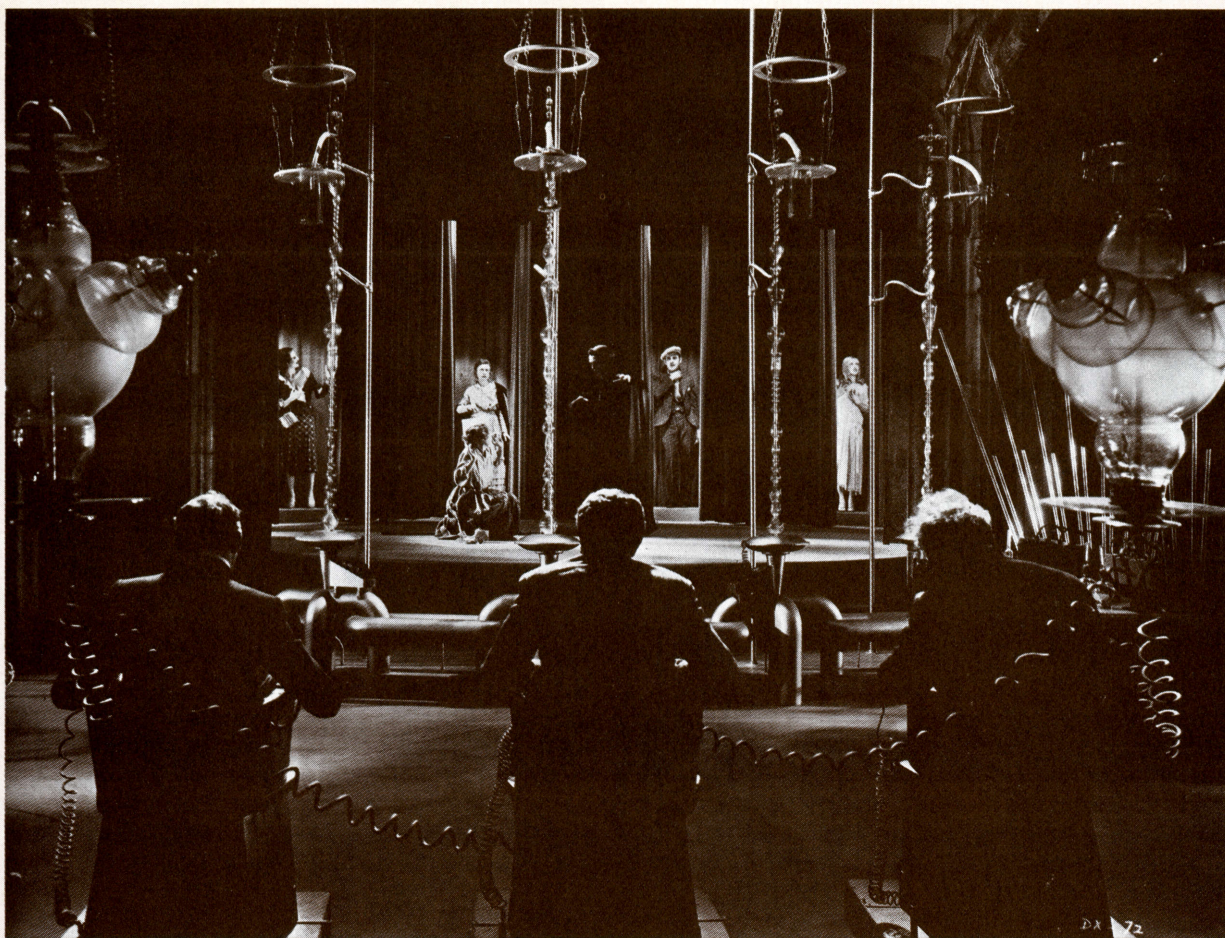
The despised Technicolor was loudly remarked upon by all of the critics, deprecated by those who hated Technicolor and horror films, but for the most part both the picture and the color received high marks. Mord Hall in *The New York Times* declared that *Doctor X* "makes *Frankenstein* seem tame and friendly," while *Harrison's Reports* thought the "synthetic flesh" sequence "the most horrible thing seen in any horror picture, even worse than the transformation scene in *Dr. Jekyll and Mr. Hyde*." Wherever it was shown, reviewers noted that the climax brought down the house with screams. *Doctor X* made a pile of money and Warners was careful to duplicate all of its key ingredients in *Mystery of the Wax Museum*.

Doctor X disappeared into memory until it was revived for television in the late 'fifties. By then, only the foreign negative was intact. Once three-color printing became the order of the day the two-color negatives were obsolete as commercial and technological entities. Early TV could only use black and white, so there was no motivation in later years to hang onto bulky two-color negatives that couldn't be printed, couldn't be telecast, couldn't do anything but occupy expensive storage space. A conformed two-color negative with its pairs of 35mm frames consisted of 2000' rolls of film, twice the size of a conventional B&W negative. And of course they were nitrate based, adding real danger to the storage of a commercially worthless film. By and large, the negatives were junked.

That *Doctor X* survived at all was because the black and white negative had been made. *Mystery of the Wax Museum* was shot only in Technicolor, and so vanished entirely. The studio hadn't even retained a shelf print.

Approximately 50 two-color Technicolor features were made. Archivists estimate that material survives on perhaps ten of them. Inserts and short subjects are even more difficult to trace, though some notable ones – the inserts for *The Phantom of the Opera*, *The Wedding March*, *Ben Hur*, and the early Three Stooges short *Nertzy Rhymes* – are still with us.

The recovery of *Doctor X* was fortuitous. With the negative gone, the possibility of a single, decades-old release print turning up was unlikely, but that is precisely what happened. In early 1970, the personal collection of Jack L. Warner yielded an unexpected cache of early films no longer



Reconstruction of the "moon killer" crimes for an audience of suspects, with Leila Bennett and George Rosener on stage. (Courtesy of Ronald V. Borst)

Photo by Scotty Welbourne

held by the studio. Most of the excitement centered around an original Technicolor print of *Mystery of the Wax Museum*, long sought by historians and the picture's distributor. Its existence tended to obscure other noteworthy items such as the 1929 *The Desert Song* and an original color print of *Doctor X*.

The print wound up at the AFI in Washington, D.C., where it was shown at the AFI theater and was allotted \$15,000 for preservation. Inquiries as to its status were answered over the years that tests were still being conducted to find a viable way of transferring the strange color. Ultimately nothing was done and the print was returned to Warner Bros. Later the BBC, who had already demonstrated faith for early color by backing a restoration of Universal's *The King of Jazz*, expressed a desire to tackle *Doctor X*; but when they got there, the cupboard was bare. *Doctor X* was, for the second time, declared a "lost" motion picture.

In August 1983, a former studio librarian's collection of films was seized by the Los Angeles District Attorney's office. Ron Haver of the Los Angeles County Museum was asked to inventory the films and discovered both *Doctor X* and *Wax Museum* among the 2,000 cans of celluloid. Examination of the prints confirmed them as the Jack Warner copies.

Both prints were given over to the Film, Television and Radio Archives at UCLA, joining the balance of the Warner Bros. studio print collection already there on deposit. UCLA carefully maintains nitrate holdings at the old Technicolor premises in Hollywood and, under the direction of preservation supervisor Bob Gitt, the archives have been doing much more than stockpiling old film. Gitt and his associates have initiated a conversion program that has already yielded an impressive heritage including the 1948 *Macbeth* in an approximation of Orson Welles' original intent, and sparkling editions of *The Toll of the Sea* (1922, the first two-color subtractive feature) and *Becky Sharp* (1935, the first three-color feature).

Gitt chose YCM Labs in Burbank, California, to do the job, having been pleased with results on both *Becky Sharp* and *The Toll of the Sea*. Operated by partners Richard Dayton, Don Hagans and Pete Comandini, YCM prides itself on specialization in processing old color materials to modern standards. Their knowledge of and experience with arcane film elements makes YCM eminently suited to these projects. They even possess one of the few extant two-color Technicolor cameras, which was pressed into service during their restoration of *The Toll of the Sea* to recreate a brief but crucial shot that had deteriorated in the ancient camera negative.

John Wray as the
lustful Prof. Haines.
(Frame enlargement).



To appreciate the difficulty in retrieving a two-color Technicolor picture we need to examine how the process worked and the industry conditions that encouraged its growth and demise. From its origins in 1915, Technicolor's camera employed a prism behind the lens that split white light into two beams. A modified camera, in active use from 1922 through 1932, would allow one beam to pass through an aperture containing a red filter and record on black and white stock a negative image of the subject's blue-green components. The second beam, entering a different aperture, passed through a green filter to yield a negative of the red components. These two exposures were made simultaneously on pairs of standard 35mm frames one atop the other, with one image inverted in relation to the other due to the prism configuration. Standard black and white film would travel through the camera at twice normal speed (in the sound era this meant three feet a second!). Exposure and lighting levels had to be compensated since each negative frame received only half the amount of light entering the lens.

After an early, untenable period of additive projection using color filters, Technicolor resolved by 1919 to put the color into the release print proper. Using a thinner than normal print film, positive prints were made on an optical printer by skip-frame printing every other negative frame to prepare a single strand, black and white positive image of, say, the red record. The negative would then be turned over and run through the printer again, creating a print of the green record. The two strands, after being developed, etched and bleached to a transparent relief, would be cemented together in register. This "cemented positive," coated on either side with the appropriate color dye, became the projection release print, thicker than normal with an emulsion on both sides. Through the 'twenties Technicolor maintained a steady business providing brief color interludes in otherwise monochrome films, but few features were made once producers determined that the expense of Technicolor wasn't offset by the novel but unnatural hues. The extra-thick, dual emulsified prints scratched, cupped and jumped focus all too frequently, racking up more bills for overhaul. Tech-

nicolor was well aware of its shortcomings and averred an early demise by introducing imbibition printing techniques in 1928, just in time for the early musical films to co-opt sound and color as box office ballyhoo.

The camera negative would still be taken in the same manner but rather than the arduous skip-print-and-paste procedure, gelatin printing matrices would be generated, dyes applied to the reliefs, and each dyed matrix brought into registered contact with a blank 35mm celluloid film to which the color dyes transferred. Both images were now contained on one side of a standard film.

The sudden embracement of color in 1929 caught Technicolor unprepared to fill the volume of orders that now cascaded in. A printing plant was brusquely organized in Boston. Technicians were hastily trained and assigned on a twenty-four hour shift schedule in April 1930 to cope with demand. Quality control became lax and critics who reviewed Technicolor productions began to warn their readers of color grain so coarse that the bilious green skies in a western epic appeared to be "raining sand." Added to this was a naive and garish attitude at the studios toward an already problematical color scale. Technicolor could not yet produce true yellows, blues or purples. Its reds were bold but tarnished, with flesh tones and the interim neutral scale pleasing when make-up and art direction were carefully attended to. Color was most frequently used and therefore associated in the public eye with operettas and musicals. Decor and wardrobe made the fatal mistake of favoring the loudest and most vulgar hues in a misguided attempt to show off more rather than better color. Dancing cowgirls in mint green shorts and candy pink blouses two-stepped with crooning bandoleros in evergreen velour denims and jerseys the color of coagulated blood under those gritty skies. Herbert Kalmus, the head of Technicolor, complained loudly to deaf-eared producers that their gross misuse of color was killing the public appetite. By the Fall of 1930, amid an industry depression that tottered all of the major studios on the brink of insolvency, the word "Technicolor" became anathema in movie advertising as the public responded as Kalmus had predicted. In November 1930, Technicolor facilities were operating at 50% of capacity as massive layoffs added ex-color technicians to the breadlines. While most of Technicolor's energies were channeled into perfecting three-color, this slackening of volume permitted them to be a good deal more attentive to the final two-color jobs. Both *Doctor X* and *Wax Museum* use color so carefully that they come close to rivalling three-color.

Fortunately, the *Doctor X* print was in relatively good shape. "It was a pretty straightforward job," says Comandini, YCM's vice president of Engineering, who saw the project through the lab. "It had none of the complications of a *Becky Sharp*. Working from a positive print there were no variable elements and nothing to re-register. Certainly the

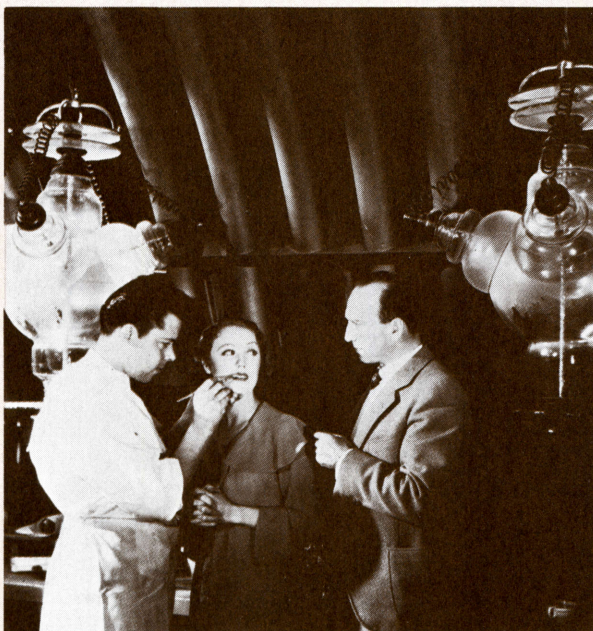
print was shrunken, but there was no deterioration." Indeed, Technicolor materials have proven surprisingly long-lived, as Comandini explains: "This is all ancient history now, but most labs were not really washing black and white film as they should have, and residual hypo has accelerated the deterioration of nitrate films. One of the things Technicolor did throughout their history was deliver the cleanest processed film that anybody was putting out anywhere. I have not run into *any* incidence of deterioration on Technicolor negative; rarely do you find any prints that have deteriorated where the deterioration didn't start from some leader that had been spliced on.

"So many two-color negatives have been destroyed or discarded that when you do find one, it's a miracle; but they are intact. The Library of Congress has *Follow Thru*, a 1930 Paramount picture, and that negative is in great shape. By contrast, *Sunset Boulevard* was one of the last nitrate features, in 1950, and the whole last reel of that is history."

There are a number of ways for the modern laboratory to deal with archaic color elements. The 1930 Goldwyn picture *Whoopie* was restored from its camera negatives by making a CRI, and while the results are attractive and entertaining there is a noticeable falsity and desaturation of its colors. The same is true for portions of *The King of Jazz* recreated from camera negative. "CRI is a very difficult approach to the situation," says Comandini, "and you can get yourself into color trouble. One of the problems with two-color Technicolor and the dye transfer prints from it is that the green component is somewhat strange, shifted more toward cyan than primary green. It contains a reasonable amount of neutral density and there is no filter combination you can use to effectively neutralize the green and pull a clean red record. The ND factor of the green always cross-contaminates the red." This ND factor is distinctly a problem when one must work from a positive print, as in the case of *Doctor X*. "Our approach was, rather than pull *Doctor X* apart to separations and 'recreate' it, as it were, let's consider the print as an interpositive and attempt to make an inter-negative from it."

Initially, Bob Gitt went through the print and remade all of the splices before electing to perform scratch removal on the nitrate base. He also prepped the soundtrack for transfer to a new optical negative. "Some of the noise had to be 'blooped', literally painted out," says Gitt, "but most was electronically de-popped. I set the equalization during transfer, but in no way changed the character of the sound. Warner Bros.' tracks of the early 'thirties, being Western Electric variable density, tend to be a little on the harsh, bright side, but we wanted to get the new track sounding exactly like the old, minus the pops and clicks."

Comandini spent a month performing camera tests to determine the best method and stock for transferring picture. "We ended up



Above: A charming group of doctors—Beresford, Wray, Carewe and Foster. Left: Makeup artist Perc Westmore, Fay Wray and director Michael Curtiz in *Xavier's* laboratory.

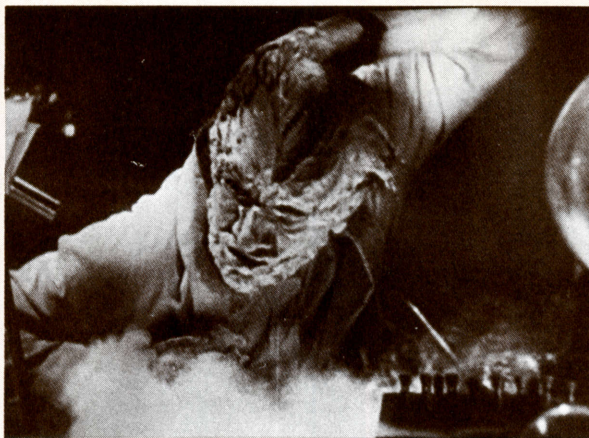
Photos by Scotty Welbourne

using Eastman Kodak High Speed 5294 negative stock because the specific sensitivities of that emulsion gave us the best reproduction of the reds and greens. We chose 5294 by trial and error with different stocks. We throw away a lot of film!

"The first test was nothing more than a wedge, but when we got our first running test and got in the ballpark for balance, everybody gave us rave reviews. UCLA was very excited by the results."

"Richard, Pete and YCM did a terrific job," enthuses Gitt, "though after I saw the initial tests my one concern was that we get a little more yellow in the picture. Two-color Technicolor has an overall warmth; its whites have a pearly antique qual-

Preston Foster becomes the moon-mad monster. (Frames from the black and white version courtesy of Ronald V. Borst).



ity, the reds a ruddy brick bias, the greens are a little more yellow."

Once the test results were okayed the entire feature was carefully re-photographed on a step printer to avoid the vertical blur and diffusion of horizontal lines that occur when shrunk materials are forced through a continuous printer. To run the entire job took only a few days.

Bob Gitt was pleasantly surprised by the color palette of *Doctor X*. "Unlike the Warners musical *Viennese Nights*, of which UCLA has a color nitrate print, *Doctor X*'s color is deliberately muted. Since it was a horror/mystery film rather than a musical, different colors were called into play than the pretty postcard colors of *Viennese Nights*. There are sections where there are bright tones for a frightening effect, but otherwise it stresses flesh tones, browns, black and white, with just an occasional pale rose here and there. At the climax where the villain is revealed there are sudden brighter shades of red, but even then its a rose red and not the vivid hues the process was capable of. They were attempting to use color in a natural, not an ostentatious, way."

"We actually ran the new *Doctor X* print side by side with the nitrate, and it is virtually indistinguishable. There is no appreciable build-up in grain," says Gitt, "and the only real difference would be a lessening of tone in very dark scenes. The Technicolor shadows have very deep black tones; the Eastmancolor is just slightly grayer."

"We did not do *Doctor X* the most expensive way it could be done," says Gitt. "We wanted to get the best color we could without spending a fortune. *Doctor X* cost about \$11,500 to carry us through a new negative and the first answer print. The month of testing paid off, as the first answer print was perfect. If we'd had to retime, another answer print would have cost an additional \$3,000."

While the new negative is safely housed in a climate controlled vault, *Doctor X* is no exclusive museum piece. As if to confirm the commercial sense of restoring the film, Dick May of MGM/UA Film Services has already reported the first sale of the color *Doctor X* in Europe. The initial Eastman low-fade print has already embarked on its new life, and since October 1985, audiences in London, Stockholm, Helsinki, Oslo and Los Angeles have made its acquaintance after a half-century hiatus. With the Technicolor reel of *Hell's Angels* already completed at YCM and a new low-fade print of *Mystery of the Wax Museum* nearing completion at another lab, it will continue to be joined by other examples of early color cinematography. △

Scott MacQueen is a New York producer and production manager. His career study of Roland West is in "Between Action and Cut," from Scarecrow Press.

Doctor X

A Warner Bros. - First National picture; Darryl F. Zanuck, in charge of production; production executive, Hal B. Wallis; directed by Michael Curtiz; screenplay and adaptation by Earl Baldwin and Robert Tasker; from the play by Howard W. Comstock and Allen C. Miller; screen treatment by George Rosener; art director, Anton Grot; film editor, George Amy; mask effects by Max Factor Company; Vitaphone Orchestra conducted by Leo F. Forbstein; musical score by Bernhard Kaun; photographic effects, Fred Jackman, ASC; assistant directors, Al Alborn and Marshall Hageman; makeup by Perc Westmore and Ray Romero; hairdresser, Ruth Pursley; property master, Limey Plews; prop man, L. Haffley; grip, Owen Crompton; gaffer, Claude Hutchinson; sound recording, Bob Lee; still photography, Scotty Welbourne; technical advisor, Dr. C.E. Warren; Western Electric recording; Running time, 77 minutes. Premiere, August 3, 1932, Strand Theatre, New York City.

Color Version Only

Photographed in Technicolor; director of photography, Ray Renahan, ASC; second cameraman, W. Howard Greene, ASC; assistant cameramen, Thad Brooks, Floyd Lee.

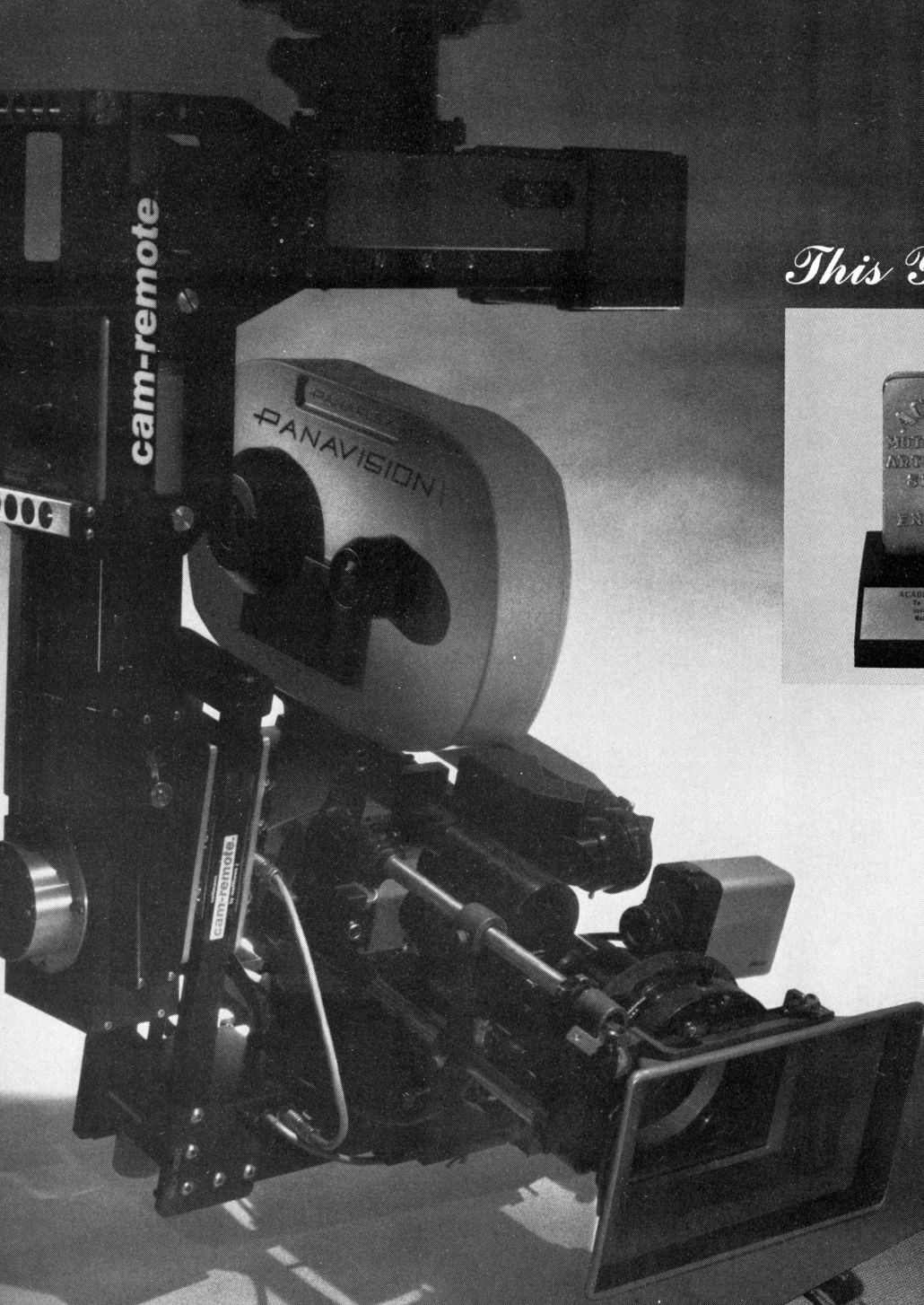
Black and White Version Only

Director of photography, Richard Towers, ASC; second cameraman, Carl Guthrie; extra cameramen, Ellsworth Fredericks, Ernest Haller, William N. Williams, W. Robinson.

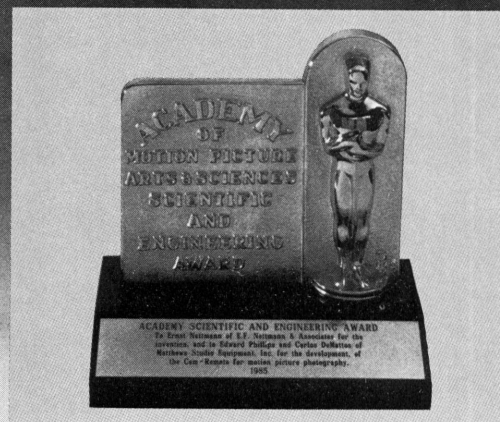
Players

Dr. Xavier, Lionel Atwill; Joan Xavier, Fay Wray; Lee Taylor, Lee Tracy; Professor Graham Wells, Preston Foster; Professor Haines, John Wray; Professor Duke, Harry Beresford; Otto, George Rosener; Mamie, Leila Bennett; Dr. Rowitz, Arthur Edmund Carewe; Police Commissioner Stevens, Robert Warwick; Police Inspector O'Halloran, Willard Robertson; Night Editor, Thomas W. Jackson; City Editor, Selmer Jackson; Mike the Cop, Harry Holman; Madame, Mae Busch; Deputy Sheriff, Tom Dugan; Murdered Scrubwoman, Josephine Gillerman.

(The author gratefully acknowledges the assistance of the following: Leith Adams, archivist at the Warner Bros. Collection, USC; Harry Miller, State Historical Society of Wisconsin; Herb Nussbaum, William Tompkin and Dick May, MGM/UA; Betty Warren, Technicolor; Bill Littman, George Stover, John Gallagher, Jim Doherty and Ray Cabana).



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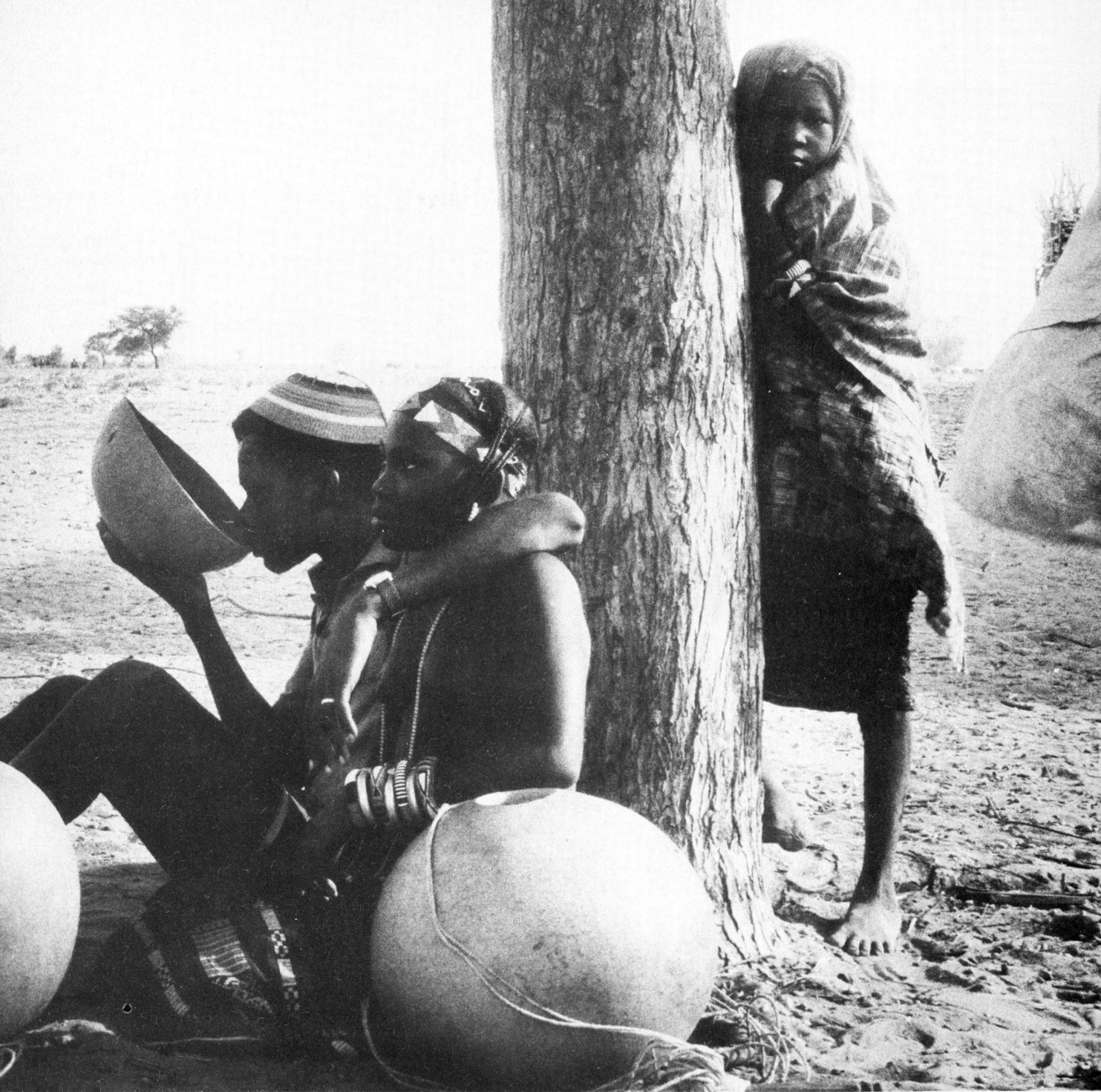
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Photos by Stephen Shames

Imaginative Lighting for *Hard Choices*

by J. Greg Evans

The dictionary describes naturalism as: "A technique of rendering artistic or literary subjects so as to reproduce natural appearances in detail." That definition also aptly fits the look and feel of director Rick King's new film *Hard Choices*.

Telling the story of a 15-year-old boy who, as an accessory to the murder of a police officer

Produced by Robert Mickelson
Directed by Rick King
Photographed by Tom Hurwitz

faces the very real possibility of spending the rest of his life in an adult jail, *Hard Choices* builds its look of haunting reality through credible acting and lucid story telling, but most genuinely through its lighting.

Much of the credit for the look of this film belongs to cinematographer Tom Hurwitz whose creative insights toward

lighting bring to *Hard Choices* its naturalistic beauty. Shot in Super-16 for a blow-up to 35mm, Hurwitz's lighting is an extraordinary example of the theatrical possibilities open to the Super-16 format.

As the film starts out, 15-year-old Bobby Lipscomb's two older brothers are contemplating the robbery of a small pharmacy. They are adamantly against young Bobby coming along but Bobby insists. Finally they agree only on the condition that he wait in the truck; they don't want him to get involved.

Shot at night, this scene takes place inside the truck and then moves outside as the boys exit by the side of the road. Because we see them drive up and drive away, the truck had to be completely mobile. To accommodate this necessary mobility, all lights on the truck were connected to a battery rig in the bed of the truck. This rig consisted of ten 12 volt batteries run in series.

Inside the truck the three boys were lit by three ½ inch peanut bulbs – tiny 12-volt quartz halogen lamps which were run off the battery rig. Outside, however, the lighting was more involved. The three boys exit and stand in front of the truck illuminated by the headlights. Surrounded by the darkness of the night they discuss their plans for robbing the pharmacy.

"Doing night exteriors in the country is very tough," reflects Hurwitz, "Because you really have to decide at some point what you're going to do about making it look unrealistic, because in actual fact you can almost see nothing in the country at night." Since this entire scene took place around the truck, Hurwitz was able to confine his lighting to that area, "... we made it feel like it was really dark there, and that made me stay close to the natural feeling." As ironic as it may seem it took 6 lights and careful planning to create this feeling of "darkness."

On a hill behind the boys was a 2500-watt HMI that served

as a moon source which rim-lighted the boys and the truck. Behind the camera were 2 more HMI's putting a little light onto the foliage in the distance. The truck headlights were replaced with two 1000-watt lamps, and a white card was used to bounce light from these lamps onto the face of the brother closest to the truck. For the other two brothers a 600-watt light was shone through a frame of diffusion to create a soft bounce light onto their faces. As Hurwitz remembers, "It didn't put any light on the truck, it just put light onto their faces." Even with all this Hurwitz still shot the entire sequence at a very low 1.8 f-stop.

Hard Choices is a film that moves fast and moves a lot and yet is always able to maintain a kind of intimacy that keeps it firmly rooted to the ground. "On the surface of looking at the script," recalls Hurwitz, "you'd think that it had so many different locations, but in fact within each scene it is scaled down so that we didn't have to light huge areas and use a huge lighting budget." This scaling down, so to speak, is just one of the elements that make *Hard Choices* such a personal and yet believable film.

At the pharmacy, as the two older brothers get out of the truck to break in, a red light glints off their hair and onto a gun. "A kind of foreshadowing," says Hurwitz, "of the violence that's going to happen."

To light the pharmacy parking lot, HMI's were put up on scaffolding just out of the shot to match the mercury lights already on the premises. Y-1 gels were used on the lights to help remove some of the ultra-violet rays. This was the largest single area that had to be lit, measuring approximately the size of a football field.

Inside the pharmacy, baby spots and inkys were used along with some soft light bounced from white cards, giving a sense of the space inside of the pharmacy, at the same time allowing it to remain very dark.

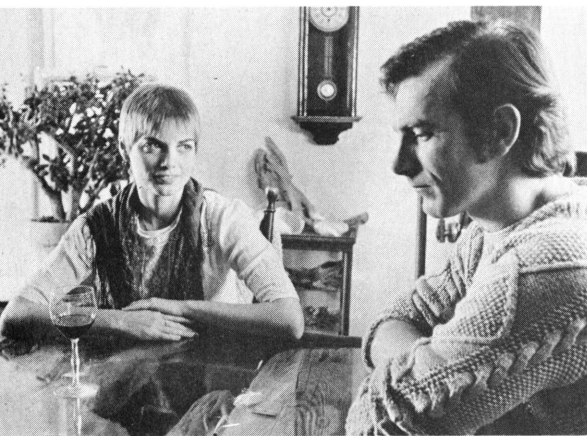


Opposite page:
Bobby (Gary McCleery) behind bars, is visited by sheriff (John Seitz).
Above:
Cinematographer Hurwitz (right) and assistant, Jim Heyman, work in scene with Laura (Margaret Klenck).
Left: From left, Drew Cunin and Mark Goodemote, sound; Jack Pine, script person, King and Klenck.

"The one nice little touch there, was the use of the red," comments Hurwitz on the lighting of the pharmacy. "It didn't really call attention to itself that much, but everytime anybody comes through that door or goes near the front entrance of the store either inside or outside, they get that little red edge that makes you feel that something's coming." For that particular effect, a 750-watt soft light was gelled red.

The use of color played a large role in the naturalistic feel of

Hard Choices. "I use color most of the time," says Hurwitz. "There were subtle shades of straws and ambers and various shades of blue, but we used gels all the time. Again it has to do with naturalism. Life is filled with various different subtle shades of color in lighting, and what I've found with the new Kodak stocks is that they will really reflect those very nicely. And so I used both dimming and gels to change the color temperature of lights."



Klenck and Sayles in scene from *Hard Choices*.

Sometimes gels would be used on lights to match the color of other lights that were already dimmed. At other times gels would be used to correct the color temperature of dimmed lights. "But for the most part," says Hurwitz, "we used them for effect to change the mood of things subtly, or to give things a warmer feeling or a colder feeling. The idea was to have different color temperatures in the same scene."

For diffusion, Hurwitz used either Lee white diffusion or Rosco opal tuff frost. Smoke was used on occasion to help define space and create atmosphere. Because Hurwitz was shooting for blow-up, he avoided putting any filters on the lenses unless it was absolutely necessary.

While Bobby waits anxiously across the street for his brothers, the worst thing that could possibly happen does: a police car suddenly appears. Startled by the policeman's untimely arrival, one of the brothers panics and shoots the policeman, killing him. Fleeing the scene of the crime, the boys soon find themselves in the middle of a high speed chase with the police.

Instead of attaching the truck to a tow car for the chase sequence the camera was rigged onto the front of the truck. Hurwitz is convinced that it gives the chase scene a sense of immediacy that otherwise might not have been there. But rigging the camera to the truck created some problems. Usually flags are put over the top of the front window of a mov-

ing vehicle to prevent light from reflecting on the glass, but their angle width made that impossible. So Hurwitz had to use a polarizing filter on the camera to minimize the reflection on the glass. Unfortunately this dropped his exposure by 2 stops, forcing him to shine battery lights into the truck to help bring up the exposure.

As the chase intensifies and more police cars join in pursuit, the boys are forced to abandon their truck and continue on foot. To capture the speed and intensity of this part of the chase, Hurwitz ran right along with the fast paced action capturing on film the frantic urgency of the boys' escape. Over fallen trees and through rocky creeks they run at full speed to escape the police. Hurwitz points out that the smoothness and steadiness of these shots are due in part to the lightweight flexibility of the Aaton LTR, and that because of it "... we were able to get such wonderful, well-balanced hand-held work."

Because Hurwitz was moving so quickly it was impossible and impractical for him to look through the camera. Asphron lens attachments were used to decrease the focal lengths of the Zeiss 12mm lens to 6.6mm, and the 9.5, lens to 5.4mm. These front elements not only decrease the focal length of the lens but they also greatly increase the angle of acceptance. With this added help Hurwitz was better able to carefully judge the composition of the frame.

"The idea of the lighting was to reflect naturalism," recalls Hurwitz. "To make it feel real and at the same time be able to respect the meaning in the script, you want to express the drama at the same time as you make it feel real."

But as Hurwitz is quick to point out there is a big difference between realism and naturalism and he uses the lighting of the truck at night as a prime example. Replacing the truck's headlights with 1000-watt lamps was a move toward naturalism. "With

realism," says Hurwitz, "you'd show headlights the way they really are, which is fairly dim, but headlights to your eyes in the dark of night feel like they're incredibly bright. We wanted it to look like headlights seem in the dead of night."

Having things look the way they feel was a guideline for much of Hurwitz's lighting on *Hard Choices* and this "feel" was achieved by the use of controlled soft light. "A lot of feature guys, the older feature guys especially, think of soft light as uncontrollable and so if you want to control light and model things you have to use hard light. But we've developed techniques for controlling soft light so that by using small, soft sources that we can put them very close to the frame. We can make the lighting very natural and still achieve a high level of contrast."

Because two of the seven weeks' shooting *Hard Choices* were spent at the jail location it gave Hurwitz the opportunity to light each cell separately, which proved to be a real advantage as far as time was concerned. With the lights on various dimmers Hurwitz was able to shoot with greater flexibility. "I didn't have to move my lights," recalls Hurwitz, "as much as I just had to turn on certain sources and turn off other sources, and dim some up and dim some down. You always have to move lights around," he adds, commenting on his lighting of the jail, "but for the most part it was there and that saved a lot of time."

While shooting in the confines of the jail cell Hurwitz found that one of the hardest things was trying to preserve the contrast ratio, while at the same time keeping the light on the actors' faces richly textured. "Because we were lighting so close to people," says Hurwitz, "there was always a tendency for the light to wrap around and fill up too much. It was always a question of moving these little 'light boxes.'"

The "light boxes" that Hurwitz refers to are constructions from foam core and show

cards that could either be put on the end of a grip arm or rigged into place. They could be moved around as needed," says Hurwitz "... to put little pieces of soft light in various places." Not as background light, however; hard light could be used for that since it stayed primarily in the background. The light boxes were used in the foreground as sources of controlled soft light. Built in various shapes and sizes depending on their use, and utilizing bulbs that ranged from household bulbs of various wattages to photo floods, the light boxes could be moved where needed, as Hurwitz so aptly puts it "... to 'paint' a piece of light somewhere. You can do anything with lighting as long as it works," Hurwitz concludes. "As long as it feels right and as long as it looks right, in terms of its mood and its feel to the camera."

Because Bobby was in his brother's truck at the time of the murder, he is an accomplice to the crime and could be tried as an adult. But despite the hopelessness of his situation and the cruel nature of his surroundings, Bobby attempts to make the most of it. Because he is a minor, Laura Stephens, a social worker, fights to get Bobby his own cell. In time, he befriends both Laura and Sheriff Johnson and is soon made a jail trusty. But for each good thing that happens, an even worse incident takes place. Battle after battle is lost in court and it soon looks as if 15-year-old Bobby will be spending the rest of his life in an adult prison.

In a dramatically lit scene where Bobby listens to a cassette tape from his brother telling of the horrors of prison life, the shadows from the bars of his cell are like a giant spider web slowly smothering life from him. To shoot this, a cell had to be used from a different part of the jail because it had a cage over the top which allowed them to shoot down on Bobby as he listened to the tape. Two lights were used from outside the cell to create the web-like shadows.

Though everything at night was shot with hard lights

which create big shadows, the reason this particular shot is so striking is because of the lack of movement. "In all the night scenes there were big shadows," says Hurwitz, "but they seem somewhat oblivious because of the action that is taking place."

Because the space inside the jail cells was so limited, Hurwitz, who did the majority of the camera work, had to shoot everything hand-held. This kind of flexibility was actually viewed by Hurwitz as a godsend. The kind of smooth fluid movement that Hurwitz was able to get from hand-holding the camera in all of the jail scenes also helped to minimize the feeling of claustrophobia that prevailed. "It is quite subtle and you almost don't see it when you're viewing the film," recalls Hurwitz, "but the camera is in fact moving around inside the jail cells in a fair number of the scenes."

Using wider focal lengths was also employed to help undercut the claustrophobic feeling in the tiny 5' by 7' jail cells. This created tremendous problems trying to hide the lights, but as Hurwitz recalls, "We didn't want to make all of our focal lengths so tight that everything would be unbearable, we wanted to use wide focal lengths."

As Bobby's fate seems more and more inevitable, Laura's feelings for him become more and more involved, and after another client commits suicide Laura can no longer stand idly by knowing Bobby could be next. The following morning Laura enters the jail and breaks him out. Both outlaws now, they seek refuge in Florida where finally, after being hunted down by Sheriff Johnson, the film draws to its dramatic bittersweet conclusion.

Hard Choices was shot in Super-16 and blown up to 35mm by Du Art laboratories in New York. And unless it were projected next to a 35mm film it would be almost impossible to tell that it was shot on Super-16 "... and that's a real statement for the technology of Super-16 blow-up," says Hurwitz.

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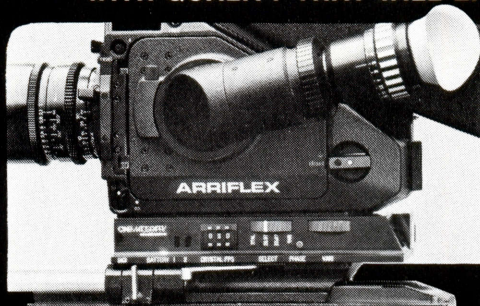
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Knowing how to expose for a blow-up is in many ways just as crucial as the lab that does the blow-up, and Hurwitz is very familiar with shooting for blow-up. (Hurwitz, along with Robert Young, shot *Alambrista!* which was one of the very first films shot in 16mm specifically for blow-up.) "The trick," says Hurwitz, "is to make the lab have high printing lights and to give yourself a very dense negative. If you keep your negative fairly dense, you'll be much better off in terms of a blow-up."

Obtaining this dense negative is achieved by maintaining a particular level of exposure. "Generally," says Hurwitz, "my experience has been that what would look like overexposure is the way to go." But even Hurwitz admits that "overexposure" is an erroneous term. "It's not *over* anything," emphasizes Hurwitz, "overexposure means that you're distorting the response to the silver and you're not doing that, you're just creating a thick negative and you're making the lab use higher printing lights."

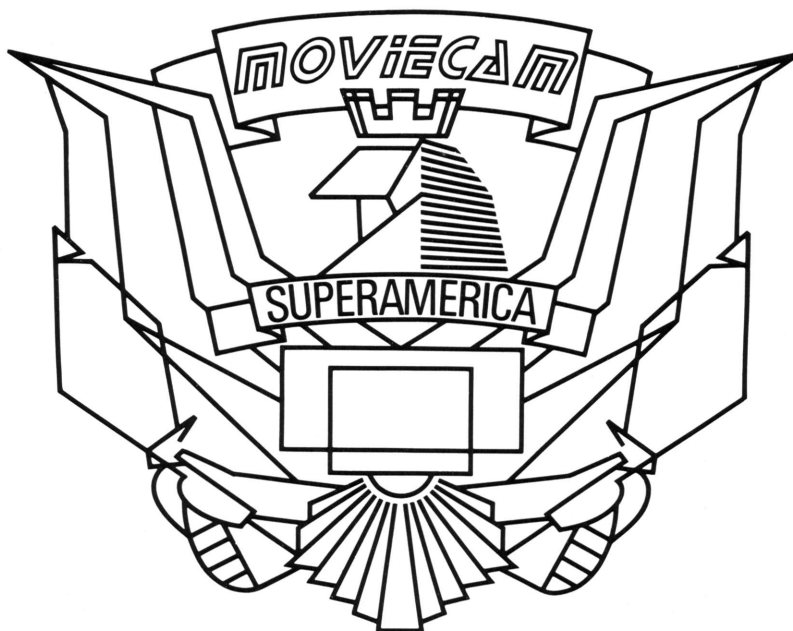
A thick negative tends to generate a less grainy look but Hurwitz also discovered that the way one lit and composed played a large part in how grain was seen or not seen. "We found," says Hurwitz, "that where the eye has distinct points to fall on, it sees less grain. So we lit for relatively high contrast and we composed for relatively discrete clear composition." This meant that large flat compositions were avoided since they do not tend to blow-up well.

"Everything you do in a film has to come out of the spirit of the film," concludes Hurwitz. "The camera work has to be very reflective of the script and of the basic needs of the film, just the same way that the editing does and the lighting and the acting. It all has to be a piece and serve the good of the final product rather than call attention to itself." △

J. Greg Evans is a freelance writer and cinematographer in Salt Lake City.

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Photos by John Shannon

Stirring Up *Big Trouble in Little China*

by Mark Steensland

Big Trouble In Little China has been described as a combination suspense/action/comedy/kung-fu/ghost-story," says Dean Cundey, ASC, the film's director of photography, "but it's basically an action-adventure picture along the lines of *Raiders Of The Lost Ark*.

The film tells the story of Jack Burton, played by Kurt Russell, driver of a semi-rig called "The Pork Chop Express," who

uses his truck to haul pigs to the market for slaughter. After winning money from Wang Chi, the owner of a restaurant in San Francisco's Chinatown, in a gambling game, Burton follows Wang Chi to the airport to collect. Wang Chi is there to pick up his bride, arriving from Peking. Before the two can reach her, she is kidnapped by a vicious Chinese gang, The Lords Of Death.

Produced by Larry J. Franco
with Keith Barish and Paul Monash
Directed by John Carpenter
Dean Cundey, ASC, director of
photography

Burton tries to help Wang Chi find his bride and they soon discover that Lo Pan, a 2,258 year-old ghost, has kidnapped the bride because he needs a Chinese female with green eyes in order to appease the gods and return to his human form.

The trail leads Burton and gang underneath Chinatown, into the world where the ghosts live. They encounter a plethora of places: from The Hell Of The

River Of Ashes, to The Great Arcade, and the Spirit Path – and a host of characters: from One-Ear and Needles, to Thunder, Lightning, Rain, the Door Guards, and the mysterious Flying Eye.

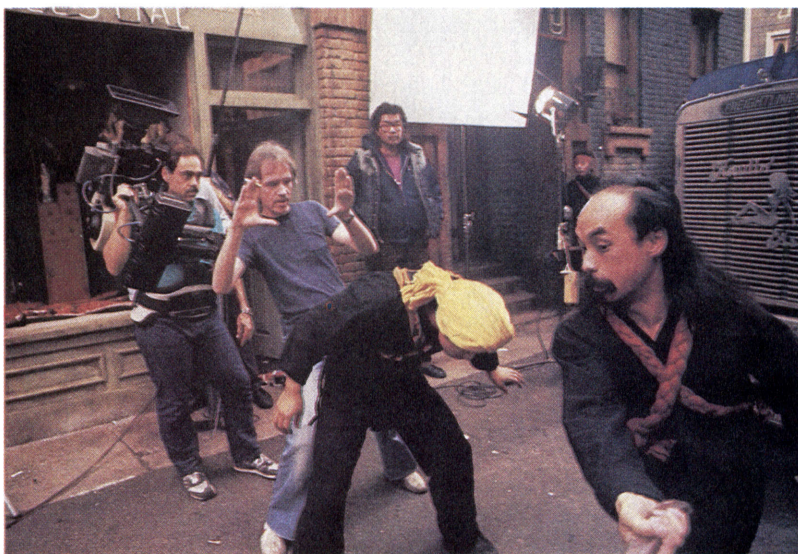
Cundey, who has worked on more than 45 feature films, as well as having photographed almost every film by John Carpenter since *Halloween*, describes his job as director of photography as “fulfilling the creative concept of the director and improving or supplying one if there is none.”

In grammar school, Cundey became interested in theater and film when an instructor encouraged him to put on several little plays. Following that, Cundey decided that he was interested in motion picture production design and that he would study architecture in college so he could get into the union. “I guess I’ve always been very visually oriented,” says Cundey, “always drawing and things like that.”

But, while at UCLA film school, Cundey took a class from James Wong Howe, ASC, and immediately became interested in the photographic aspect of filmmaking. Says Cundey, “Taking the class made me realize that the cameraman was dynamically involved in creating the visuals. The class was very interesting because we took a simple three-walled set and Howe would then demonstrate how to create mood with only light patterns and contrast ratios.

“His was really the first style that I actually studied because I had the chance to talk with him as well as see his work in the form of dailies. Howe has been attributed with creating a rather naturalistic style to his photography and that is something I try to do with my own work, although bending the laws of nature to create a certain mood is something about photography that I particularly enjoy.”

After graduating from UCLA, Cundey was called by several classmates that had convinced Roger Corman to finance their first feature. Having done make-up on several of the students’ shorts,



Sets designed by John Lloyd (above, left and opposite page), reflect careful attention to detail resulting in accurate Chinatown backgrounds, all built indoors to facilitate atmospheric effects. Below: Ray Stella, camera operator and Carpenter, with Al Leong, filming martial arts sequence.



Above: Chinatown street scene in make-believe rain. **Below:** Dean Cundey on camera with producer Larry Franco and Jamie Anderson behind Cundey.



they asked Cundey to do the make-up on their feature.

"I had just graduated and I can remember thinking, 'Gee, this is really great, you graduate from film school and people just call you with work.'" says Cundey.

Following the four week schedule on that picture, Cundey was sitting in his apartment trying to figure out what his next job was when suddenly, the phone rang. "It was Roger Corman," muses Cundey, "and he wanted me to do make-up on a feature he was directing." That film was "Gas-s-s."

"After that," laughs Cundey, "I figured I should proba-

bly just sit around and wait for calls for photographic work – but they never came."

Deciding that he would have to do something to dig up work, Cundey set about creating the MovieVan. "I was very intrigued by the Cinemobiles that were being created at that time," says Cundey, "and on all of the low-budget features on which I had been working, there was always a scramble to put together a package of equipment from the various rental houses."

Cundey and several of his friends took a Dodge van and modified it with extra doors and interior compartments. They then leased a package of equipment and started renting themselves out to producers as a package deal. "It also gave me the right equipment, which made it easier to do better work."

Another invention of Cundey's is the flicker-box, or computerized light modulator. "That came about as a result of *Escape From New York*, says Cundey, "In our discussions of the film, John Carpenter and I realized that there would be very little of the civilized conveniences – namely electricity. We felt that fires would be used mostly and that created a problem for me.

"In the past, in order to create a flicker effect, you had to have a guy flickering a dimmer.

You can't really rely on people being able to interpret fire. Although some guys are very good, most of them end up like discos, and I knew I would have to flicker large light sources."

What Cundey required was an electronic device. "With a friend who is an electronics engineer," says Cundey, "I sat down and laid out the requirements. We created a device with an electric eye that would read the fire source and then flicker the lights accordingly."

Not only used to interpret fire, Cundey explains that the device also has a computer chip inside that allows it to flicker the light sources to imitate signs and other blinking light sources. "I've used it to some effect on almost every show I've done," says Cundey.

Cundey's first feature as a full director of photography was filmed under the title of *The No Mercy Man*, although he admits that it sometimes shows up on late-night television under the title of *Trained To Kill*. When the opportunity to photograph Carpenter's break-through film, *Halloween*, came through, Cundey had already photographed 18 features.

"The producer of *Halloween*, Debra Hill, had been script supervisor on several of the features I had worked on, as well as script supervisor on Carpenter's first "real" feature, *Assault On Precinct Thirteen*," remembers Cundey, "and when she told me that she and John were doing a feature, she thought that we would make a great team." And she was right. That initial teaming was repeated five times, on *The Fog*, *Escape From New York*, *The Thing*, *Halloween II*, and *Halloween III*. After a brief hiatus, in which Cundey photographed the box-office block-busters *Romancing The Stone*, and *Back To The Future*, the director and cinematographer are once again paired for making *Big Trouble In Little China*.

"We had three weeks of pre-production on this film," says Cundey, "twelve weeks of shoot-



*Peter Kwong in hat,
Dennis Dun in chair,
Russell kneeling.*

ing for myself, and four months of post – all to ready the film for a May release.” Although that sounds relatively short for a film of this size (while at 20th Century Fox, the production occupied five stages with a budget of \$19 million), Cundey praises the production designer, John Lloyd, with making his job easier.

“John Lloyd is very good,” says Cundey, “and he saved me a lot of the work that I would normally have to do as far as defining the visual look and sources of light on the sets.”

While shooting, Cundey encountered few problems, although he is quick to announce that no production is without its problems. “That’s one aspect of filmmaking that I find most rewarding,” says Cundey, “and every film carries with it its own set of problems that have to be solved – which I think is a lot of fun.”

The first problem was during a sequence in which several of the characters escape down a three-foot drain pipe that is half full of water. “The problem,” says Cundey, “was that the characters had to swim into this drain-pipe, stop in the middle where they exchanged some dialogue, and then swim down the rest of the way – while the camera panned with them.” Cundey had just completed a commercial prior to *Big Trouble* in which he had used a snorkel lens, thus the solution came to him rather quickly.

“I knew that we couldn’t get the camera in the pipe, maintain the minimum five-foot focus plane required for anamorphic, allow the characters to swim by, and pan,” says Cundey, “so I had a hole cut in the pipe and we slipped the snorkel down inside. Then I lit through other holes that were covered with grating. This allowed us

to shoot from the middle of the pipe and keep the camera out of the way so the characters could swim by and we could pan with them.”

The final shot of the film, which finds Burton driving his truck along a rain-drenched highway at night, created the other problem Cundey encountered. “John wanted to have one long take where we started on Russell’s face in a close-up as he’s driving the truck and talking on his C.B. radio,” says Cundey, “pull back, glide along the side of the truck past his name and everything, to the back of the truck, where the trailer should be.

“We discussed whether or not it would be possible to drive the truck, to light the stretch of road necessary, and to rain the stretch of road necessary. We knew it wouldn’t be, so we decided to use poor-man’s process (shooting on a stage draped in



black with lights on fishpoles swinging by the stationary vehicle thereby creating the illusion of movement) and we put the truck on a stage and the shot required the flexibility of the Louma crane." The shot is exactly as it was planned.

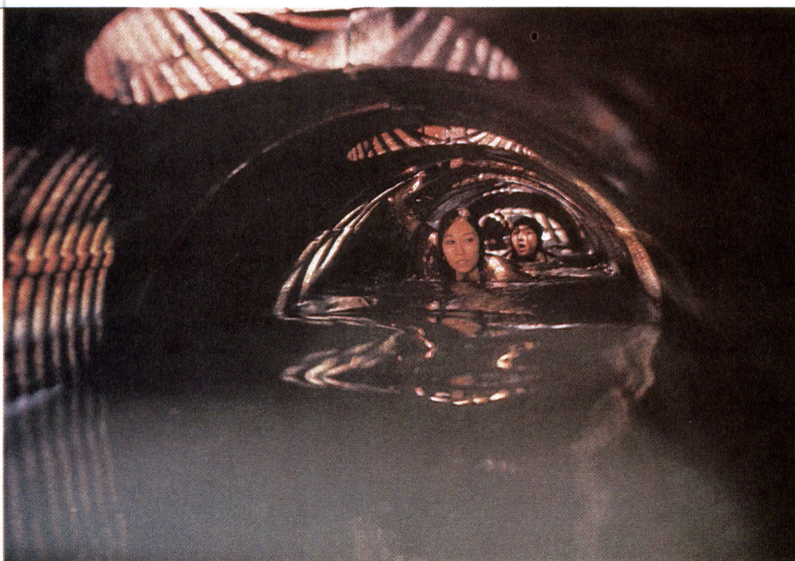
Since the film contains extensive optical effects work by Richard Edlund's Boss Film Corporation, Cundey took special precautions in the lighting of sets that would be shot by the 65mm optical unit. Says Cundey, "One of the things you have to consider when you're shooting opticals is that it will be a dupe neg. For the best quality, we like to over-expose a half-stop and then print down so that some of the grain and contrast can be eliminated. Since the optical unit uses Haselblad still lenses on their 65mm camera, which are not as fast as the Panavision lenses, I had to make sure there was enough light.

"Since they have a 170 degree shutter, as opposed to the 200 degree shutter on the Panavision, I knew that they would need another stop of light. So, if I had a T.4 for us, I lit so that the optical unit could have the T.2.8 they needed-providing them with the best negative possible."

While the introduction of the incredibly fast Kodak 5294 finds most directors of photography shooting their whole film on that stock, Cundey still prefers to use the slower 5247 for some. "I generally use the 94 for interiors and night exteriors," says Cundey, "and the 47 for day exteriors. I know that some use 94 for day exteriors, but to me, it looks a little funny. The 47 provides me with less grain and the color seems to be less warm and desaturated."

Rather than rate 5294 at the 320 ASA provided by Kodak, Cundey rates the stock at 500. "Most of the time," says Cundey, "although when I'm shooting night exteriors, I tend to rate it at about 400 ASA to make sure the blacks are nice and dense. Also, rating it at 400 ASA causes it to print higher on the scale. I think

Above and right:
More atmospheric
scenes all on-stage
at 20th Century Fox,
including
underground tunnel.



Big Trouble was printing at about 38 – a nice dense image.”

Another problem that Cundey encountered was the staging of an outdoor Tong War sequence, involving a massive melee with 75 stunt persons inside on a sound stage at Fox. Originally, the sequence was going to be shot on location in the alleyways and streets of San Francisco’s Chinatown, but after an investigation into the logistics of such a plan, the idea was quickly discarded. “They decided it would be easier and quicker in the long run to actually build the exteriors on the stage,” says Cundey, “But trying to make an interior look like an exterior is very difficult since there is no way to light with one point source, like the sun.”

The script, however, because it was set in San Francisco, provided Cundey with the beginnings of a solution. “Because San Francisco is a foggy city,” says Cundey, “my job was easier since I didn’t need to duplicate sunlight – but rather, the overcast look.” The street set completely covered Stage 6 at 20th Century Fox, and Cundey’s lighting solution was to stretch a silk over the entire stage – about two square blocks.

“We hung coop lights – which are rectangular lights containing about six 1K lamps each – from the top of the stage and then hung the silk below it,” says Cundey. Fifty of the coop lights were hung some 40 feet above the set. “By the time the light reached the stage,” says Cundey, “it was very soft – almost shadowless.”

“We hung one section of the stage and then I took my meter and read it to make sure that we had a decent F-stop, because one of the things about shooting day exteriors is that you usually have a pretty decent exposure, and if we were at too low a light level, the fact that we were inside would be given away because of the lack of depth of field.” Cundey ended up with a T.4 on the floor and was satisfied enough to have the rest of the stage lit the same way.



Above: Victor Wong followed by Russell and Dun and party slip through underground tunnel. **Below:** Crew members Stella, Gary Kibbe in back, Steve Tate and Carpenter preparing shot.

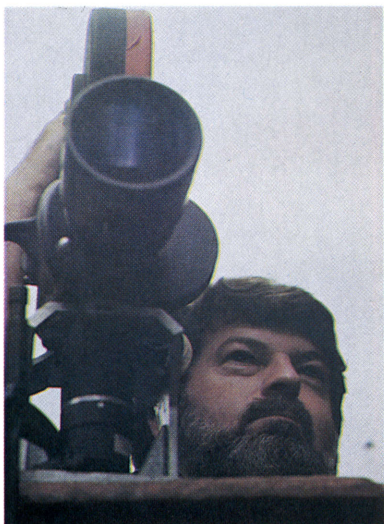
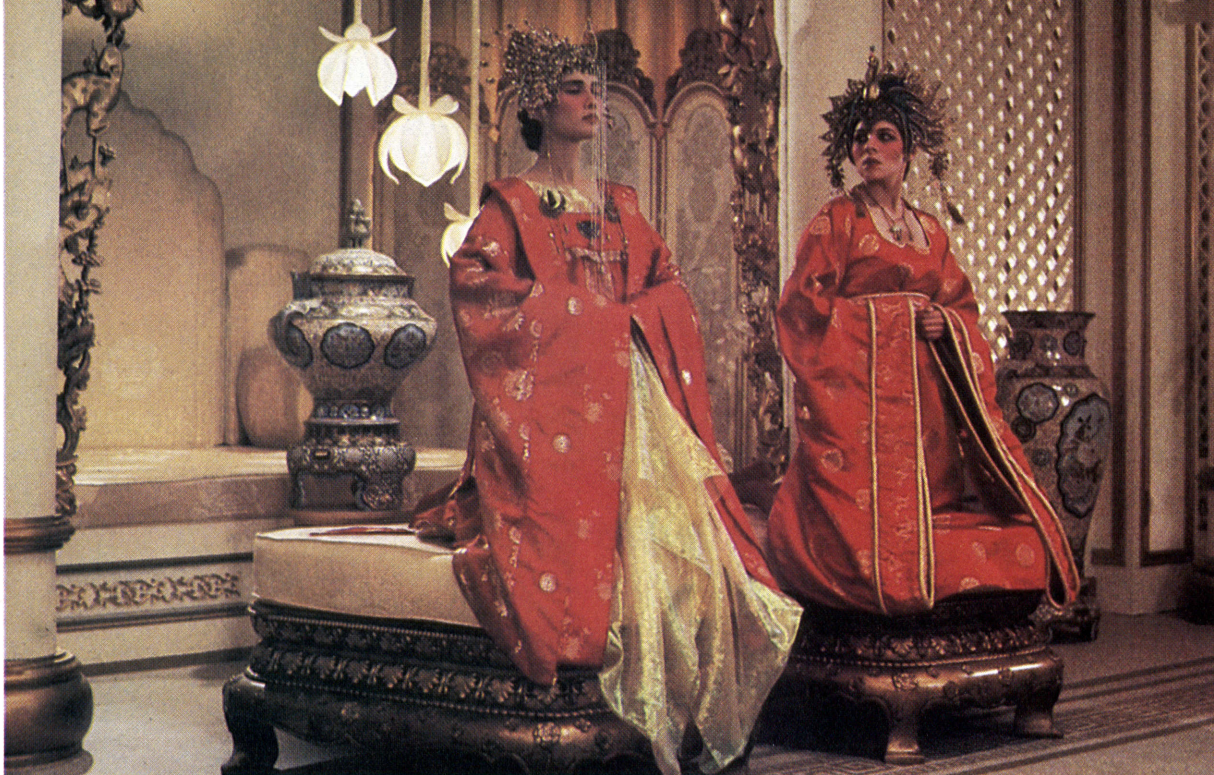
Following this, Cundey had the second-unit cameraman go onto the stage and shoot tests at different angles and exposures. “We found that by underexposing it anywhere from a half-stop to a full stop,” says Cundey, “gave it the suitably gloomy look that we were looking for to create the illusion of a foggy, overcast day.”

To have the whole stage lit in such a way afforded Cundey and Carpenter the ease of moving from set-up to set-up without having to deal with little more than fill-light for faces, or a little back-light to pick out certain individuals. “It was handy,” says Cundey, “because we were dealing with large action sequences where

you don’t want to take time to intricately create a set-up.”

“One thing that I would like to fool around with, if the same situation ever arises,” says Cundey, “is something we discovered while we were shooting the tests. We were always afraid of tilting up and seeing the silk, but we found that when we did tilt up and we were a little overexposed, the silk looked like a white sky. We mounted remote fog units along the top of the buildings and had them squirt fog at set intervals so that it would hang along the silk, and the few times that we do tilt up, it looks like clouds, fog, and a realistic white sky.” With all

Suzee Pai and Kim Cattrall Below: Cundey.



of the elements carefully combined and choreographed, the illusion of being outside on a San Francisco street is perfected.

"One of the things that I like to do," says Cundey, "is give each scene some kind of contrast with either the scene before or the scene after so that you're not always looking at the same kind of 'look.'"

"The great thing about the script was that it had this almost built in. One moment, we would be in an area that was lit high-key, and then we would go into an area that was very low-key with fire as the light source and smoke for effect.

"One thing I like to do a lot of is place the light source within the frame because I feel it sort of 'explains' the lighting. I think it is a good way to get light into a tricky area by placing, say, a lamp on a table. It saves you from having to do a lot of artificial lighting, and the lamp obviously looks more realistic than anything you can do."

"I used to shoot the whole script as I read it," Cundey claims, "but I don't do that anymore. I found that very often, what I had conceived in my head was different from the director and I have always thought that the director has the last word on a film.

"I find that one of the most enjoyable things about filmmaking is that each film is a different experience. You're dealing with a different director, different actors, different production designers, and it's rare that all of those elements are duplicated.

"I don't feel any particular loyalty to the director or producer. My job is to serve the film and provide everyone involved with more than is required by budget or time limitations."

When asked what his best work as a cinematographer is, Cundey is quick to reply: "I always like to consider my next one as my

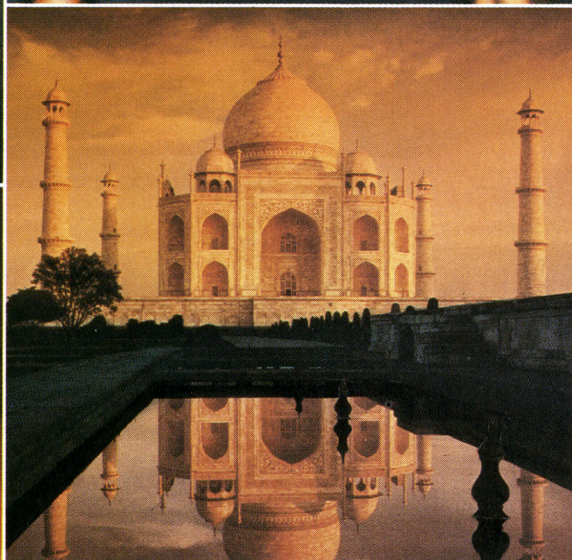
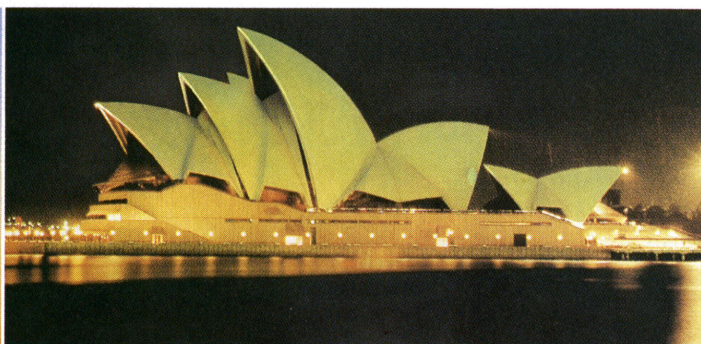
best, although *The Thing* and *Escape From New York* have some of the visual elements I most enjoy doing.

"I was also very pleased with the way *Back To The Future* came out. The idea of creating two times and subtly altering each one photographically to create those times for the audience was very exciting."

Only days after wrapping *Big Trouble In Little China*, Cundey crossed the Fox lot and started shooting *Project X*, the new Matthew Broderick starrer. "It's about a guy in the airforce who dreams of being a fighter pilot," explains Cundey, "and one day, he is assigned to Project X, which he thinks is the training program for fighter pilots, but he soon finds out otherwise.

"I never turned down a project in the early days, because I always knew that each project would afford me the opportunity to experiment with someone else's footage and solve problems and learn. Photography allows me to move the audience with the visuals, and that's what I like doing best." △

Mark Steensland is a freelance writer and assistant cameraman based in Los Angeles.



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Photos by Virgil Mirano

Big Effects for *Big Trouble*

by Les Paul Robley

Boss Film functions like a self-contained studio of old. The company is broken into many different departments, each contributing to a particular effect's basic requirements. A still and litho department keeps track of all previous effects for films; animation and rotoscope divisions visually "sweeten" the look of live action footage; a matte department expands scenes and sets with paintings; a lab and optical department create black and white separations and mattes and composite shots; a creature shop located several buildings away excels in the rubber monsters and miniatures business; a

machine shop serves as a photographic pit stop where designers continually soup-up camera gear – and finally, an editorial department catalogs by computer all the separate elements which eventually come together to create a convincing composite. At the center of this nondescript complex is a screening hall for dailies, a kind of special effects forum where artists and technicians from all the various departments meet each morning to applaud or throw magical eggs at the work completed the day before.

Richard Edlund, Boss' soft-spoken boss, prefers to com-

pare his gathered craftsmen to the "think tank" philosophy used in big business.

"We're like members of the Blackhawks," he admitted. "There are about a dozen or so department heads at the core of the group which might fluctuate between 80 and 170 people working on up to five projects at a time. Thus, there's a tremendous crossover in conceptual ways – a cameraperson might also be engineering oriented, or a class-one powderman may double as a mechanical genius. But the end product is the result of all kinds of



Opposite page:
George Jenson's
conceptual drawing
of the battling ghost
warriors, Lo-Pan and
Egg Chen. Above:
The epic battle as
seen in the film.

“The writer generally doesn’t describe what things look like . . . so it’s left open to our interpretation. . . .”

thinking from everyone in the group.”

A forgotten studio expense, always budgeted in Boss’s endeavors with any production worked on, is research and development. R & D (usually coupled with the equally defunct studio effects department) used to be an integral part of any studio roster. Following the dry spell of effects pictures in the sixties, these divisions likewise evaporated. Not until the effects renaissance of the seventies, signaled by *Star Wars* and *Close Encounters of the Third Kind*, did special effects and R & D again become a staple part of

studio filmmaking. But, they were no longer found on the premises. Independent special effects companies, in essence, became the special effects tools of the eighties industry.

In Boss’ case, the theory goes as follows: The studio with them at the time reaps the benefits and expertise of everything that has led up to that stage. To compensate, studios must pay the piper for equipment they might not necessarily see until the next round of contracted effects. And Boss’s customers generally do come back.

“One of the interesting things about doing visual effects is having different kinds of challenges,” Edlund says. “I won’t get involved in a hack job where we’re called to do more of the same kinds of effects. Our short three-year history as a new company will show that any film approached from a mature standpoint regarding visual effects will have a look all its own. Being based in Los Angeles allows us to take advantage of the great pool of experience and vibrancy that exists here. We’re seldom placed in situations where we have to take pictures we



Above: *The Chinese arcade and its neon-lit idol.* Right: *George Jenson at work.* Below: *Jenson's concept of the character, Thunder.*



don't want just to keep people working."

Big Trouble in Little China is a project not unlike *Ghostbusters* in that it required Edlund's crew to come up with new ideas to define the picture's mystical oriental flavor. In fact, many of screenwriter W. D. Richter's characters were based on genuine Chinese folk figures.

Long fascinated by Chinese art, Edlund has collected books on orientalia throughout his career. Even though *Big Trouble* deals with Chinese culture on a purely pop level, he and Boss Film's art director, George Jenson, always tried to incorporate this aspect into the effects whenever the situation presented itself.

For scenes involving the character, "Lightning," the animated bolts which shot from his fingers were patterned slightly after real Chinese calligraphy characters. At first, a definite oriental stroke style was incorporated into drawings made by Jeff Howard, Peggy Regan and Mauro Maressa, but problems soon developed in making the artwork move properly and resemble actual lightning.

"As the idea evolved we found it looked too blatant and obvious," explained Jenson. "It lost much of the flavor of real lightning. So we compromised by going back to a basic electrical flow, having the oriental look appear subliminally at interesting moments. It's there, but you have to look for it."

Other less subtle Chinese influences are found in Steve Johnson's old-age makeup designs for James Hong. The veteran Chinese actor plays the film's sympathetic villain, Lo-Pan, who has the power to transform himself from an ancient warlord into a youthful seven-foot-tall mandarin. The makeup was painstakingly applied up to eight hours each day by Ken Diaz. Johnson employed 12 overlapping appliances which included fake eyelids, a foam rubber bald cap, and special material that, when applied to stretched skin, formed natural wrinkles when released. Since this was Johnson's first "standard" makeup design for a motion picture (he supervised scores of monsters throughout his years as chief designer at Boss' Creature Shop), he spent a great deal of time studying Chinese facial structure and personality translation.

To get an idea of the complex procedures involved in a typical effects shot at Boss, let us follow the climactic battling warrior segment as it makes its way through the various departments to completion.

Just as the production relies on a production designer and a director of photography to establish the "look," Boss employs its own artisans who are equally dedicated and integral to the film. Art director George Jenson was in charge of conceptualizing the effects shots. All of the initial designs originated from his department. Working with illustrator David Jonas, Jenson began with rough pencil sketches to work out the initial idea. These preliminary drawings later arrived at The Creature Shop where Johnson and his crew took them to realization.

"The writer generally doesn't describe what things look like, as a rule," he commented, "so it's left open to our interpretation. We supply detailed drawings to lead in and out of the effects scenes. Then, storyboards take over to establish camera angle, size relationship and character of the lighting. This provides a flow of continuity and allows us to construct a proper size perspective and composition. In most cases we storyboard the action before the sets are built to get a head start on the effects. I received blueprints of the sets from production designer John Lloyd so we used his floorplans to establish where our action would take place. This storyboard, in effect, becomes our Effects Bible."

The idea for the two hovering, spiritual warriors squaring off in the great arcade was added about three-fourths of the way into production. The script originally called for two fighting dragons, but Jensen suggested this stronger alternative to John Carpenter. The amorphous, sharding, light on light colors, swirling behind the transparent duelling figures, proved better than showing the two aged characters, Lo-Pan and Egg Chen, kung fu-ing each other to the death.

To help visualize the idea, Jensen chose to illustrate the effect with a full color painting. Since the warriors were to be strongly backlit, looking more spiritual than real, he wasn't too concerned with showing much detail in the masklike faces. Individual color schemes for the stylized costumes were noted on a separate black and white pencil sketch for instances when the clashing swords flared and illuminated the warriors with animated light. Makeup artists used an iridescent paint to catch flashes of the sharding colors.

"This was a difficult concept to understand on film, so a painting proved the best way to sell it," he reflected. Since the background called for was extremely hot, there would be difficulty in getting costumes to read



The ancient-looking idol with Twentieth Century neon trappings as realized by production designer John Lloyd.

against the strong backlight as all the colors additively crossed over and became white. All these problems had to be worked out conceptually on paper first, before they could succeed on film.

Jensen relied on large 5 by 12-inch blowups of the background plate to help plan how big the figures should be within the frame. Even though he prefers the more pleasing 1.85 aperture for composition, the long horizontal 65mm format worked splendidly for the two-character confrontation.

Though Edlund utilized VistaVision when he was at ILM, he prefers not to use it at Boss. On *Star Wars*, VistaVision seemed the cat's meow. Cameras could be bought for as little as \$1000 apiece and one had access to all the available 35mm stock. But 65mm is

Edlund's favorite film format. When owner Douglas Trumbull asked him to become a partner and assume command of the Marina Del Rey facility, the existing 65mm equipment was like an extra dab of whipped cream on an already tempting dessert.

"Although VistaVision does avail you of a large negative, there are lots of technical problems with it," he pointed out. "The film is difficult to keep steady in the gate since you're hanging the film off one end with one set of registration pins. The only way to keep it steady is to use three pins in the printer with an Estar base film. Estar has virtually no shrinkage. If you have a third pin situation in VistaVision without Estar, when the film shrinks the perfs deform, making it impossible to maintain steadiness. Also, since it tends to shrink more lengthwise

The creature shop crew articulating the glowing eyes of Lo-Pan.



than widthwise, one winds up with a matte line that no printer adjustment can properly alleviate."

On the other hand, 65mm has almost double the working area of VistaVision for better resolution and grain, and the more modern Kodak standard perforations are more versatile than Bell & Howell (C.1910) negative perfs. The grain structure of 65mm is not the problem it is with VistaVision, since the latter doesn't effectively accommodate the 2.35 to 1 aspect ratio.

"Also," continued Edlund, "a complex effects shot may not be composited for a year. Not all the elements may be shot at the same time. If you put the shot together using acetate film, the various films will shrink at different rates and you'll end up with a technical nightmare. (Many of Boss's high-speed cameras can't handle acetate stock. The stronger Estar perforations are able to withstand the stress of high-speed pull down claws and registration pins.)

"Kodak has been a helpful ally in providing Estar base 65mm film stock. It's not a matter of availability, it's a matter of Kodak being willing to produce special orders. All of our film is special ordered on Estar in lengths of up to 35,000 feet for 65mm and 66,000 feet for 35mm; 5247 is used as the primary camera negative (50247 is the Estar base designation) with 5294 (50185) for high speed and low light level photography. The reduction ratio between 65 and 35 is so great we don't have to worry if one scene's been shot on 47 and one on 94. There *are* problems in dealing with 65mm, but they're nothing compared to VistaVision."

John Lloyd's underground arcade set for *Big Trouble* required a 65mm background plate. All the plates were photographed with 65mm effects cameras which are certified rock steady, having been made for different capabilities than standard motion picture production equipment.

Bill Neil is Boss's special effects cameraman in charge of location plate photography. When a scene such as this is heavily interwoven with live action, it's easier for him to shoot on the existing set rather than drag the actors to Boss and duplicate it there. It's also better for the film.

"I prefer to have the first unit cameraman light the set so that everything remains the same," Neil admitted. "I also encourage the operator to check my framing. My goal is to have an effects shot that integrates as seamlessly as possible with the rest of the footage. I'm not going for perfect composition in the shot. I want it to have the same quality and idiosyncrasies as the first unit's shot.

"Whenever there's a sequence in the film which follows or precedes our work, I'm there to advise and foresee the possibilities of being painted into a corner. Sometimes a director is not terribly experienced in dealing with effects and will block a sequence in a way which makes the effects shot difficult to execute. I don't always

have the luxury of being there. But when I can it gives me a better overall idea what the film's going to look like, and how it affects the post-production work I'm going to do."

Neil really has no style of his own. He must imitate the style of the cinematographer he's working with and match whatever's been done. "Part of the challenge for me is to figure out what they're doing," he added. "Usually I examine the previously shot material and discuss with him our limitations and parameters. We do visual magic, but to pull it off well the stage must be set for it."

For the warrior sequence, Neil went over storyboards with the first unit so that they knew what to expect. This allowed him the flexibility of working out any problems on the board level to make the shoot flow as smoothly as it could. He shot mostly 5294 since that was the stock director of photography Dean Cundey had used. In all, about 70 to 80 plates were made for the entire film – mostly locked off. This, and a wider field of view to anticipate all the action, are usually tell-tale giveaways in even the best executed effects shots. George Jensen's original drawing depicted a much wider image with the two Chinese visible on either side of the duelling warriors. But, since John Carpenter adopted a quick cutting style for the picture, many of these wide shots were eliminated. Carpenter instead decided to shoot the sequence in a series of fast medium shots much like the rest of the film. This actually made life easier for Boss, with less complex sandwiching in the printer.

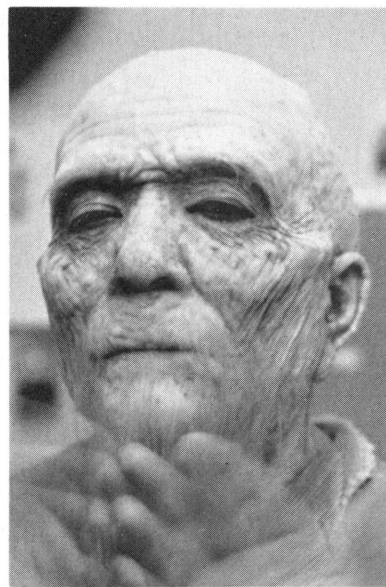
The only moving plates in the film were ones accompanied by animation, such as the lightning effects. The elements could be roto-scoped perfectly to match the live action. Currently, Boss is designing a prototype tracking camera similar to the concept Edlund pioneered on the Dykstraflex used in *Star Wars* and the VistaCruiser at ILM. A boom arm holding an underslung 65mm camera using the Trojan helmet pan-tilt-roll



head will be able to duplicate movements made on location in perfect registration.

"When it's completed, it'll be a real behemoth and yet be very facile," foresees Edlund. "All the bells and whistles are what give you the opportunity to build in flexibility so the thing can be modified for any requirement." As should be evident by now, nothing at Boss ever gets very far in the door without being modified in some way.

In the mandarin warrior sequence the figures rise up from the colored beams which Lo-Pan and Egg Chen shoot at one another. The crew wanted the light to appear to emanate from the warriors, so they backlit two Chinese martial artists on a stage at Boss using brutal projector arc lights designed for theatres. The lamps were aimed at the taking lens with the figures silhouetted in between. Smoke was pumped onto the stage to create a scintillating sharding effect. The actors stood on a table-top bathed in dry ice to give the effect they were hovering in mid-air. The platform (draped in black) was sketchily lit to lend an amorphous quality to the smoke that stirred from their

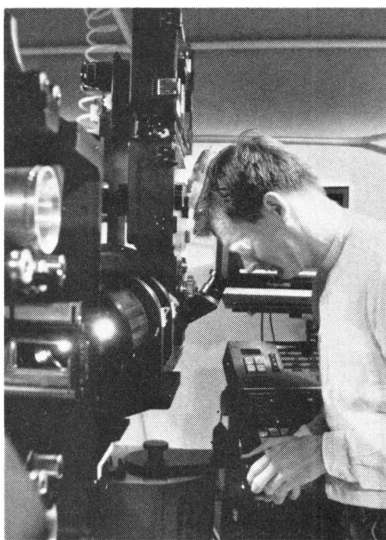


Above: Steve Johnson sculpts the "old age" concept for Lo-Pan. Left: James Hong as the doddering Lo-Pan, designed by Johnson and applied by Ken Diaz.

movements. Color wheels were placed over the lights, counter-rotated so the beams dynamically clashed into one another as the characters hacked at each other with huge swords. The enormous arcs were gimballed on boom arms for up, down, pan, tilt, and side to side movement. Thaine Morris – himself a master at "low-tech" solutions to problems – was instrumental in rigging the gimbals.



Above: Richard Edlund and the remarkable ZAP optical printer. Right: Chris Regan, optical department supervisor at Boss.



Practically weightless, the arcs were controlled from behind to rehearsed movements made by the actors. Lamp operators scurried back and forth on platforms, trying to keep the figures always between themselves and the 65mm camera. They had to track the actors precisely so that the light didn't flare too often in the camera lens. When the actors stepped back a foot, the lights twenty feet behind obviously had to move much more. No matter

how often they rehearse, humans cannot do the work of motion control. Occasionally the lights broke out, creating blinding flashes in the smoky atmosphere.

To break up the spot effect and help obscure the platform, Neil strategically placed smudges of petroleum jelly over the lens. He used three bands of diffusion: around the feet to hide the platform, near the mid-section where the arcs would most likely flare out, and above their heads for a misty look. Thus, some parts of the frame retained crisp edges whereas others were soft and blurry.

"I used practical sympathetic colors (green for Lo-Pan, red for Egg Shen) as rim light to represent each character," Neil recalled. "We shot with 94 to get the most out of the lights. We also had two 10Ks with gels on the floor backlighting each figure, which helped enhance the glow around them. I used rim light so they could have some contrast edge to them. No fill was needed. The smoke effectively scattered the light, adding its own fill and bringing out minor details in the face areas. Separate green and red foreground lights located very

close to the camera illuminated the smoke with its respective glow."

Appropriately, some refer to the animation stage as the "sweetening" part of post-production. Often it's these little touches of "Disney dust" that make the difference between a shot simply working and a shot looking fantastic. Boss never loses a generation from these extras. It's just another element to be added to the greater scheme of things.

Special projects supervisor Garry Waller is also called the man in charge of odd phenomena. He's good at making the things people often have trouble putting into words. In *Big Trouble's* case, he and his crew conjured up such shapeless terms as "green glow," "clouds," "beams of light" and other vagaries too obscure to mention.

For the warrior segment, the animation department created soft red and green beams to represent the two old Chinese characters. Air brushed animation effects enhanced the aura around the warriors. Flares and sparks appeared whenever the swords clashed, and a weird swirling vortex simulated the mystical power engulfing the duelling swordsmen.

The green aura representing Lo-Pan's existence was fashioned partly inside a cloud tank.

The tank enables one to control various substances injected in the flux of water. An inversion layer in the tank is created by laying fresh water over a supersaturated salt solution. A piece of plastic above the saltwater aids in carefully filling the top half with fresh. When the plastic is removed, the bottom liquid is so dense that it supports the fresh water, preventing the two water layers from blending too much. Paints with ultra-violet dyes are injected into the fresh water. Often, fibre optic lights can be coupled with the tube to achieve an eerie luminescent glow. The cloudy mass expands, seemingly weightless above the saline solution. The camera sits outside the transparent

tank below the fresh water, shooting up through the inversion layer at the neutrally buoyant expanding dyes. As a result, the inversion line is not visible. Should the camera point horizontally through the glass, it might pick up the line of demarcation separating the two watery layers.

Sometimes Boss submerges an underwater snorkel system into the salt and fresh water mixtures. Equipped with an x-y gantry arrangement, the system can fly a 28mm super-wide snorkel lens attached to the 65mm camera. The advantage of being inside the tank enables the camera to move dimensionally through the cloudlike formations. The super wide angle lens offers enormous depth of field with less liquid between the camera and the object.

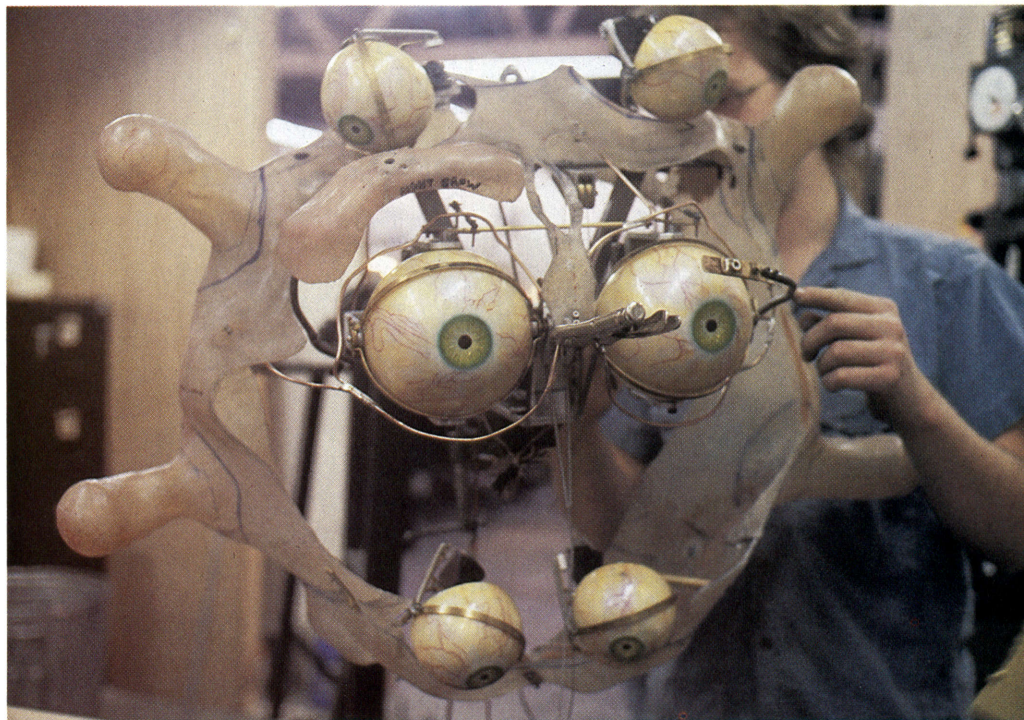
Edlund used a mockup version of this system on *2010*. Boss later developed a set of field lenses for various focal lengths, making it a versatile underwater tool for numerous odd applications. The cloud tank has now become as common in an effects studio as an optical printer.

Which leads us to the final phase of the sequence – the optical department. This is where the whole becomes greater than the sum of its parts, where all the pieces of the complex jigsaw puzzle come together. But, if one of the pieces or elements doesn't fit properly, this is when the throwaway term "fix it in optical" takes on a decidedly serious meaning.

For optical supervisor Chris Regan, this stage of operations is as much an exercise in logic as it is in patience.

"The term 'fix it in optical' is kind of a sad thing," he confessed. "The optical stage has design qualities to it, but the whole thing is really the problem solving stage."

A cardinal rule at Boss is "Thou shalt not go more than one generation," although with 65mm it is possible to, if necessary. "Rarely does a take-one go out unless a series of shots are similar," said Edlund. "Usually it's



take-two or three before we get a composite that we like. *Big Trouble* has not been that complicated in terms of the number of elements compared to a film like *Jedi*, which had at one time 50 elements flying at the camera for a three-second shot. An average shot is anywhere from six to eight planes of elements."

For the warrior segment, the characters were vignettted-in with a soft hold-out matte. Once they grew to full intensity, the background was only visible around the edges of the static matte.

A new aerial head printer was used to composite all of the 65mm elements. Dubbed the ZAP (Zoom Aerial Printer), it was built for *Poltergeist II*, but has been applied on four other film releases. The two-projector head printer currently has seven axes of motion control stepper motors with more to be added. The camera lens remains fixed, projector one and two each have independent xyz movements, and the aerial lens between the projectors (the lens that puts projector two in the same plane as projector one, with less than .01% linear distortion across the whole field) is a zoom.

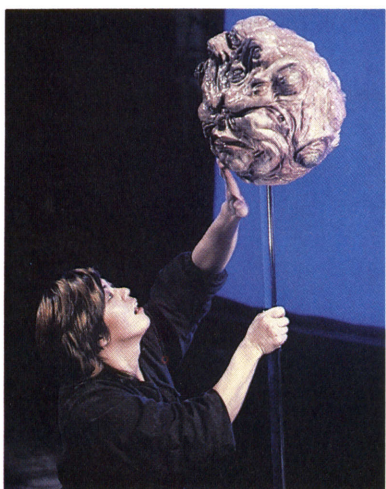
"It's the only true zoom lens ever built for an optical printer," Edlund enthused. "It's a mathematical nightmare with several optical element groups moving on precision corkscrew cams at different rates." The entire retro-focus lens housing itself moves in relation to the stationary heads. This is opposed to the old design of moving the lens to increase magnification and refocusing the projector. Each element is on an individual cam with all of them riding on the same axle. The mechanical system was built by Gene Whiteman in-house from Mark West's design and all tolerances add up to .0012.

The optics were designed by David Grafton who had previously won an Academy scientific and technical award for a telecentric lens built for Edlund while he was at ILM. The entire printer is motion controllable to the extent it can perform compound moves in any individual axis or any combination of axes. This means it can zoom while panning in any NSEW direction, and will repeat the same move for each three-color separation. This is useful for shots which do not have the facility for making optical moves at the

A look at inside the "eye creature" with its complex controls.



Above: Puppeteer/sculptor Screaming Mad George (his legal name!) painting the "eye creature."
Below: George with the small-scale "eye creature" puppet in front of the blue screen.



time the separate elements are photographed, such as during precision high-speed photography when objects are difficult to track. It can also aid in fixing poorly composed effects shots, perform scale changes on the fly, and has any number of other subtle control capabilities. And according to Regan, the backlash is finer than the distance between two grains of Kodak fine grain.

Those concerned about grainier release prints when making optical moves with ZAP, needn't worry. The obvious advantage of working in 65mm is that it's very forgiving in terms of blowups. Explained Chris Regan: "On 47 original, 65mm negative grain isn't a problem. 5235 (separation stock) does show more grain than an IP. But since you're shooting separations, they won't get blown up in the composite. They'll always be one-to-one."

A major character in the film which received more screen time than any other visual effect was the ubiquitous spy with its all-seeing nest of eyes. The 16-inch diameter sphere was constructed 8-inches larger than it appeared on film in order to encompass all the rods and cables which controlled its expressions. Background plates were shot at Fox, locked off in 65mm. The eye was photographed separately against a 7-foot backlit blue screen. Actually, the screen only needed to be a few feet round, since garbage mattes could fill in the unused stage area. But Annick Therrien was fed up with the "free for all" attitude of fixing everything with roto-mattes, so Bill Neil came up with a solution.

A 13-inch hole was made in the screen through which all the cables and wires could fit. The creature effectively obscured the rods and cables, and all apparent "floating" was made by moving the camera in relation to the eye. Matt Beck manually manipulated an old Mitchell gear head that contained very little backlash. He didn't have to worry about motion control since the eye's floating movement didn't relate to the static background plate. The hole behind needed to be smaller than the eye's perimeter so the camera could move slightly around it. This gave a more dimensional hovering effect so the creature was not always static on one plane.

Coordination and lighting were the two biggest problems. As the eye needed to be relatively close to the blue screen for facial articulation and weight suspension, frontal lighting was minimized to avoid spill. It was either back lit, rim lit or edge lit. According to Neil, up to 20 puppeteers operated different aspects of the creature. Since most of them were behind the blue screen, they weren't able to see the eye. Sometimes the mechanism would break or the radio controlled units would pick up interference and the 30-working eyes would comically begin looking about in all directions.

Some shots were overcranked to smooth out any clicks and chatters in the mechanism. Unfortunately, a few still needed to be corrected in optical. The new ZAP printer was called upon to create extra drift without altering the background, since these elements were photographed separately. But one other sequence required a lot more time to fix.

The fog plus the base density of Kodak 5294 is inherently different than the 47. In one of the 94 background plates filmed with very little light, Chris Regan noticed in the negative a crystalline pattern in portions of the scene which were black (i.e. clear or containing no density). "If you look at 94 under a microscope there's this inherent crystalline pattern built into the base," he explained. "If you take that to an intermediate positive for the dupe, that pattern is reproduced in the black area. You have the density of a snowstorm and the apparent loss of contrast is a little offensive."

To correct the problem, Regan made an IP of the scene and sandwiched it with a corresponding fine grain intermediate positive mask in black and white. He made the latter extremely thin so that it only represented detail in the shadow area. The end result was an apparent increase in contrast with more density in the blacks.

Kodak 5294 is not currently suitable for blue screen. There is too much sensitivity in the green, so that a clean blue separation cannot be generated without contaminating the green record. According to Regan, "Blue screen works well in 47 because the stock has enough separation between the green and the blue. In other words, what you rely on is the difference between the blue record and the other two primaries: green and red. On a red fine grain positive, the screen is black. On a green positive, the screen is not quite as black. With 94, you don't find enough separation between the green and the blue. Blue screen shot with 5247 does have less den-



Ed Felix adjusts the "eye creature" in front of the blue screen.

sity in the green, but with 94 it's even worse."

All but two shots involving the eye creature were filmed blue screen. The scene in which Kurt Russell stabs it and flings it off his sword was shot at Fox using the practical stage lighting. For this scene, the spy was the proper medicine-ball size. Later, when the beast licks its wound with a massive tongue, an oversized set piece provided the background in order to match the scale of the creature. No blue screen proved necessary since the tightness of the shot made the background nondescript and out of focus. Both of these scenes cranked normal 35mm Panavision, as no opticals needed to be produced.

Other difficult optical effects surrounded the character Lightning. Upon his first appearance, he rides a lightning bolt into the scene as if it were a fire-pole. Boss flew lifesize dummies provided by The Creature Shop on wires. They rigged practical lighting effects on them to correspond with the later rotoscoped

animation. For scenes when bolts emanate from his fingers, practical effects man Joe Unsinn placed small arc units off camera which threw out bright interactive lighting on the characters. The light was flagged according to how much they wanted it to play on the actors. The Unsinn box's purpose was three-fold 1), to help the actors react; 2), to illuminate the surroundings; 3), to cue the animators when to begin the rotoSCOPE.

First, Garry Waller examined the live action plates with Dennis Michelson and Ron Moore in editorial to figure out where the lightning effect should begin and end in the shot. The plate next went to rotoSCOPE to lay out the action by pencil tracing the projected image onto white bond paper. This enabled Waller to determine the exact path he wanted the lightning to follow. Animators then drew pencil tests of the bolt. The bond paper was backlit, toplit and photographed on video for quick evaluation. "The backlight-toplight method

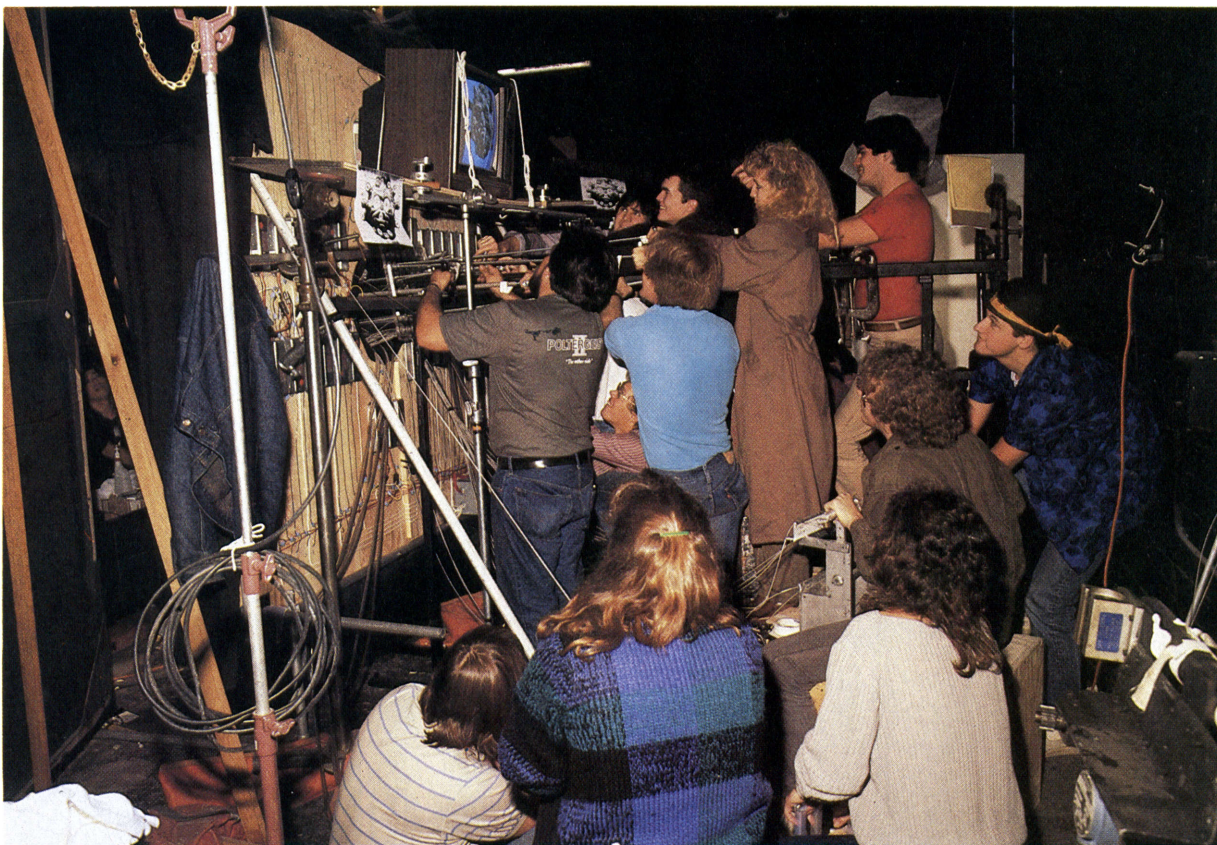
makes a kind of dx (dissolve) where you see the character through the paper and the lightning drawings on top," offered Waller.

Following approval, a black and white pencil test was shot. This next traveled to optical where a crude black and white composite was produced. Finally, the work print was sent to John Carpenter for approval, giving the editor something to cut sound to, as it was by now close to deadline.

"We then go through the laborious process of inking white on clear cel and photographing these against black," Waller continued. "We diffuse and color each pass with gels behind the lens. The prominent bolts are white, usually foreground with finer bolts trailing off to add depth. This makes them appear further away by seeing less detail.

"For the first pass, we thinly air brush certain portions on another cel and shoot through a blue filter. We next burn in another pass of green using only the lightning cel. The third pass uses

The creature shop crew behind the blue screen operating the eye. The monitor screen shows them what the creature is doing.



no color, but the diffusion is changed so that the bold lines become white and any thin lines stay green. The green and blue create cyan and blend into the white element. The airbrush will flicker a little, creating a sparkly, scintillating effect."

It normally took the animation department three hours to shoot one 90-frame scene. By utilizing top lights, Waller strove to move away from the traditional bottom lit mode of effects animation. As a consequence, he was able to obtain a much finer, thinner edge, plus retain the delicate stroke of the calligraphic style Edlund wanted to subtly imitate.

By now, the 65mm processed footage had finally arrived to Chris Regan in optical. "Garry specifically requested caution to be taken with the diffusion that he's building into the electricity. If the electricity goes in on a dark scene, it's an easy composite. Now if it goes in on a light scene, it's a little more complex. What he's looking for is retention of the sat-

uration in the diffusion as well as the saturation in the central area. In other words, he wants it to go in hot enough so it looks realistic. But the diffusion is, in effect, a half-tone and for that to go over, say, a colored background or a bright background, it normally adds up to white. So, our trick is to matte the hot center portion in 100 percent."

Waller tried to refrain from using holdout mattes since they don't normally yield themselves well to the air brushed fine-line softness he preferred. "If the bolts go into scenes with squibs and the scene goes completely white, they may look pasted on. They usually get a brownish edge if not done right. I want the white to bleed into the animation and dissolve into it."

Waller hoped to merely superimpose the lightning into the scene and lose the hard edge completely. But if he loses saturation in the green and blue aura, Regan may have to build in a retentive fine grain matte as opposed to the

typical high contrast matte. "It's just something that you're constantly fighting," agreed Regan. "If you're going over saturated background, you beef up the density. But as you beef up the density, the relative blackness of the matte comes up. So, design-wise, it's a contrary reality. When you put the electricity through a dark scene, it looks normal, but when you put it into a bright scene, basically you don't know what that looks like - it's not reality. No matter how true and how correctly you matte it, that saturated green over red will never be real. And what does green over a red background look like? It should additively make yellow. But the problem is, you want to keep that green flavor."

Two other complex optical effects involved scenes in which Lo-Pan passes through walls and runs his hands through the body of a girl. For the latter, the actor knelt in front of a blue screen with an articulate that represented the torso line of the

woman. (In the special effects vernacular, an articulate is something made carefully by hand that shows a crucial cutoff, such as a person disappearing behind a wall.) In this case, the articulate represented the point at which the blue-screened hand entered the body. But the trick here was that the hand did not dissolve 100 percent away (which would have been relatively simple). Outside the body the hand remained 100 percent normal. As the hand entered the body, effectively becoming a ghost, it became five stops thinner.

"We first make the matte that works over the background with the articulate so that it's clipped at the torso," revealed Regan. "Then we lay in the top light pass. We make it as normal as possible in the scene. Then we go back and lay in the B side of the clipped-off part—the part that's inside the girl. We put it in at a fraction so that it's less dense. We need to soften the leading edge (the interfering edge of the articulate), but maintain the blue screen matte at full clarity."

For the scene where Lo-Pan floats in mid-air, the production had the actor physically gliding about on a small Western dolly. When he passes through the wall, the crew used a similar technique in reverse. They left the actor stationary in front of a blue screen and tracked the camera away from him. A slight wisp of air blown over him heightened the illusion, making him appear as though he were actually moving. For the disappearing act, it was simply the interference of the blue-screened character against an articulate matte. In this case, it was the articulate which took him out, not the lessening of light. An animated shimmer was optically added in later.

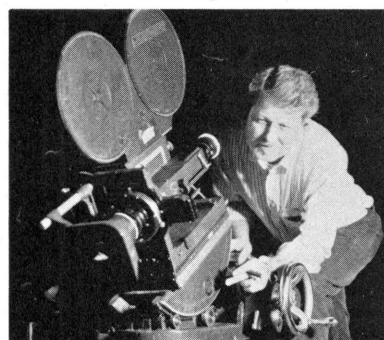
Coming out of the wall proved another matter entirely. Instead of the blue-screened character being printed through a reveal, a lattice drape hung between the wall and the camera in the background plate.

Regan was supplied with a blue screen shot of the camera tracking toward the actor, the static background plate, and a back-lit pass of silhouetted lattice against a white card. Thus, Lo-Pan had to be matted in front of the second wall, behind the lattice, so then the articulate would reveal him through the lattice. A practical light effect on the blue screen stage heated the actor up as the camera moved toward him, simulating the shadow of the lattice-work against his body. The rest was up to Regan:

"I took the matte of the lattice and the blue screen of Lo-Pan, and if I put them in combination, the interference put Lo-Pan behind the lattice, but in front of the second wall. What I had to do was, through the use of an articulate, punch a hole through the lattice as Lo-Pan did his move. In other words, Lo-Pan is behind the lattice and the articulate takes him in front." Because Lo-Pan was not yet flesh, he didn't need to move the lattice at all. Imagine the complexity of the shot if he did!

Two extraordinary animated effects clearly illustrate Boss's quest for new horizons in special effects. Each borrowed elements of older techniques, but were presented here in new exciting ways. The first, developed by Matt Beck, rear projected 35mm footage of a paint mixture into a dome. As the film was advanced frame by frame, the dome was manipulated to create a weaving, organic image. The character Thunder jumps over this when he makes his raucous appearance at the film's beginning.

The other effect involved the overused slit scan technique, originally developed by Doug Trumbull for 2001: A Space Odyssey. As Lo-Pan hypnotizes a girl, strange light patterns emanate from his eyes. These were accomplished by filming 47-second exposures of an electronically-controlled light box on an Oxberry animation crane. Each short sequence took about ten hours to film. The beam was bright at the

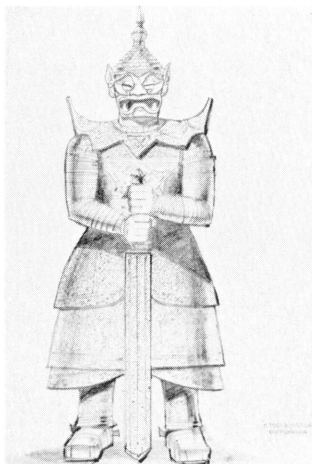


Above: Gary Waller, special projects supervisor. Left: Bill Neil, special effects cinematographer

source and continually faded out for a nice effect of depth. The images were superimposed over the background, resembling a light beam in the fog. Lo-Pan's eye movements were tracked using the rotoSCOPE technique.

As homage to the man who started it all (maybe not, but it's nice to think of it that way), one scene utilized incrementally-displaced moiré-interruption patterns as backgrounds, much like the father of modern-day film effects used for the "Opening In the Stargate" sequence in 2001. Viewers tired of seeing ships hurtling through vortexes and worm holes in space should see this as another unique application of an already remarkable effect. Edlund and company keep stretching their photographic tightrope to the limits on films like *Big Trouble In Little China*. One hopes they never fall off. Δ

Les Robley writes regularly for American Cinematographer.



Above: Concept drawing of a Chinese door guard. Right: Full size clay sculpture of the door guard, ready to be cast.



Photos by Virgil Mirano

Production Design for *Big Trouble*

by Les Paul Robley

Working closely with Boss Films in conceptualizing special effects for *Big Trouble* was John Lloyd, a production designer with over 1,500 TV and feature credits to his name. From his first job as art director on TV's "Alfred Hitchcock Presents" to his most recent, *Clue*, Lloyd has been in charge of designing "the stuff that dreams are made of" for 38 years.

Lloyd's job was to provide a visual translation of the sometimes nebulous terms the screenwriter puts

down on paper. For instance, in *Big Trouble*, how does one define and give character to such vaporous descriptions as "green glow" or "wild man?"

Often his caliber of work in interpreting these phrases directly determines the accuracy and appropriateness of mood or atmosphere in the finished piece. As a result, his architectural, decorative and cinematic savvy must be all-inclusive – from the most minute costume detail to working knowledge of the grandest "Star Wars-ian" special effect.

"What you try to do first is stop and analyze the problem," explained Lloyd. "Simply put, you take the script and design the general look of the film by storyboarding each sequence and by supplying larger, more detailed illustrations of critical scenes. The next thing you do is take these designs and consult with the director to see how he feels about them. From there you go to the applicable department (i.e., costume, special effects) and see whether or not they can do it. If there are any compromises, you go back to the drawing board and work them out amongst the three groups. Of course, once the final decision is made, anything can happen to prevent it working, and in this business it usually does."

During the early phases of production, Lloyd termed the experience a "nightmare" because there were so many things to do and not much time to do them in. "There wasn't much prep time for some reason or another and people were in a panic from the first day of shooting in October," he recalled.

For exterior scenes Lloyd relied on much of what was already available at 20th Century-Fox. The rest of the sets were built on five sound stages, one of them housing a complete Chinese street to facilitate the inclusion of mechanical effects. Edlund described the sets as some of the best to come out of Hollywood in a long while, favorably comparing them to ones in England where building capabilities are much stronger. As a testament to their realism, only a few miniatures and matte paintings were incorporated by Boss, unusual for an effects-laden film of this caliber. Many of the underground scenes didn't need to rely on vanishing points receding to infinity as is the case with the traditional matte shot.

But some shots did require the illusion of forced perspective hallways as a means of achieving extra depth. Fifty door guards lining a torchlit corridor were actually photographic reproductions of statues sculpted by Kim Jones of The Creature Shop. The guards were based on research provided by John Carpenter and looked very authentic in the face and shoulders. Face masks were molded from fiberglass with painted chin cups so the mouths would look like statues. Western Cos-

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tume provided the suits of armor, and foam rubber neck braces were made to resemble metal. The photos were successively reduced in size for the last 20 feet of the set.

Another forced perspective in-camera effect involved a scene in which Kurt Russell goes careening down a 1000-foot ramp backwards in a wheelchair. Lloyd designed the set at an angle rather than tilt the ramp to make the sequence safer to execute.

Forced perspective shots are designed to be photographed from one point on the stage. The camera needn't be locked off, but must still be placed near the center of the viewing angle so as not to violate vanishing point perspective and reveal the trick. Actors are seldom placed in the forced perspective area unless they are to appear smaller or larger than normal. When the two door guard statues came to life, a cut was made so that they make their entrance from a different viewing angle.

One of the most difficult sequences to film involved the Hall of the Upside Down Sinners. After plummeting underwater in an elevator, Russell and his party must swim past five drowned cadavers shackled upside down, in order to escape the warriors that are chasing them. Lloyd designed an underwater torture chamber inside a small tank. The set took three days to build, with bars over the windows and shafts of light pouring through.

According to Steve Johnson of The Creature Shop, the biggest problem was in trying to figure out the staging of the sequence since the set wasn't completed until the last minute. "We weren't finished with the zombies until the night before, as is usually the case, so we eventually had to rig the thing underwater," he explained. "We had to spend two days working underwater and couldn't 'fathom' how we were going to effectively communicate for that length of time."

Craig Caton and Eric Fiedler tested polyfoam latex in chlorine and no ill effects seemed to occur. In fact, the corpses actually looked more horribly bloated after the two days of shooting. The rigging crew used scuba tanks on the floor attached with hoses and regulators. No problems of decompression sickness (bends) occurred from breathing long hours of compressed air

due to the shallow depth at which they worked.

In art director George Jensen's original storyboard concept, one of the corpses was supposed to grab Russell as he swims by. "At first they're just undulating; you don't know if it's the current or whether they're alive," said Johnson. "They ended up cutting the sequence down. One of the cadavers swings toward Russell a la *Poltergeist*, and out of its mouth comes these weird creatures called waterdogs (undeveloped salamanders). We stuck rubbery air tubes in the cadaver's mouth and shot out air bubbles just as these things swim out. One of the little devils squeezed its way through a tiny hole in the corpse's cheek. It looked really disgusting.

"But we were real nice to them — didn't kill any of them. I kept recycling them, allowing them only two takes each, what with all the chlorine in the water."

After a while, the production moved like clockwork. Lloyd said: "It was difficult, though certainly not the hardest set I ever worked on. I'd rate it an eight or nine in terms of difficulty. It was one of those films that initially is tough to get off the ground, but once rolling it becomes relatively straightforward."

Lloyd also collaborated closely with practical effects man Joe Unsinn, who worked on *Cocoon* and Irwin Allen's TV *Alice in Wonderland*. "You have to design the effects visually before somebody else can make them work," he advised. "If you don't design them properly, you're in big trouble (pardon the expression). That's one thing people never seem to realize — that most effects come through art departments."

Lloyd's accomplishments took several weeks to put up, and only a few days to knock down. Such is the transitory lot of the Hollywood set. Does it bother him to see his momentary pride and joy so quickly and uncaringly dismantled by stage hands?

"It really doesn't bother me," he confessed. "The set is a fleeting thing. It goes up quickly, and then it's gone. But it exists forever on film . . . at least longer than I will." △

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Photos by Jeanne Bulliard

Belizaire the Cajun—a Gumbo Western

by Merry Elkins

Produced by Cote Blanche Films
Directed by Glen Pitre
Photographed by Richard Bowen

When Glen Pitre arrived at the Sundance Institute a few years back, his project was the only one of five chosen from over 450 nominees that wasn't set in New York or California. Pitre is a Cajun from Cut Off Louisiana, and his script carried with it a wealth of tradition passed down to him by generations of Cajun raconteurs. This was the script that was to evolve into the unique film *Belizaire the Cajun*—unique not only because of its subject, but also because of its low budget (around \$1 million), the fact that it was produced, shot, and almost entirely financed in Louisiana, and most important, cinematographer Richard Bowen filmed 90 percent of it hand held using the new Super 1.85 format.

Pitre and Bowen met at Sundance, and kept in touch during the next year-and-a-half it took Pitre to raise money for the film. Over the phone, they discussed their thoughts on the visual

concept of the story, and what the tone and texture of the film should be.

Pitre had a background in documentaries, and wanted *Belizaire* to have the immediacy of the documentary—a “you are there” feel to it; but he and Bowen also wanted the film to have a rich, lush, big-screen look, and were unwilling to compromise on the visual quality. They also wanted the movie to have commercial appeal.

Belizaire had a Western theme. “When you think of Westerns, you think of earth tones and browns and dust because that’s the way it is out West,” says Bowen. “But this is a Western that is green and wet and lush. That contradiction appealed to me.” Bowen called *Belizaire* “a gumbo Western.”

The story is set in the 1850s. It follows Belizaire, an herbal doctor, through his struggle

to save a friend from vigilantes, and through the personal struggle of loving another man’s woman.

The problem for Pitre and Bowen was how to make this period Western authentic, without spending millions of dollars, and how to shoot it so that it would look like millions were spent—not an uncommon problem for filmmakers.

What is uncommon is the way the two men solved their problem. Pitre approached the Louisiana community, and found the usual doctors, lawyers, and businessmen who sometimes invest in motion pictures; however, he also found that sugarcane farmers, crawfish processors, a teacher, and two competing manufacturers of pepper sauce were willing to put up capital for *Belizaire*. Pitre was able to finance the movie almost entirely with Louisiana money. The only exception was a \$50,000 grant from the National

Endowment of the Arts, and the Sundance Institute's development assistance and an eventual completion bond.

The Louisiana community also contributed props, authentic antiques and furniture, all from their personal collections. One family donated the use of their ranch (the Harris Broussard Ranch), 200 cattle, and a dozen cowboys to work with the cattle. Extra time and effort was taken to prepare these cattle for camera by cutting off the modern-day insect repellent tags from their ears, and then replacing them after shooting was completed.

Cinematically, Bowen and Pitre solved the problem in other ways. They hit upon a catch phrase they quoted throughout the shooting of the film: *Belizaire* would be "the best shot *cinema verité* film of 1859." To accomplish this, Bowen made the stylistic decision to hand-hold the camera. He believed this would give the film the intimacy they were looking to achieve and create the subliminal feeling that the "frame was able to breathe." Hand holding would also save money. "Without having to set up dollies and tracks, we could save money on rentals and work fast." Bowen's second decision was to use the new Super 1:85 format.

He learned about Super 1:85 by accident. Bowen was in Studio City at Clairmont Camera, and overheard Denny Clairmont conversing with cameraman Jim Dickson. Several months before, Dickson had come to Clairmont with the idea for Super 1:85. He wanted to use a bigger negative for his film *The Counselor*, but he didn't want to shoot super wide screen. He wanted to shoot 1:85 to 1. He asked Clairmont to center the lens as he does for Super 35, and then to mark the ground glass accordingly. After shooting the movie, he discussed the advantages of Super 1:85 with Clairmont. It was this conversation Bowen overheard.

Historically, in the days of silent films, movies were shot full aperture. But in 1932 when



Opposite page: Bob Edmundson leads vigilante group through the swamp. Above: Crew works under very damp conditions. From left, Glen Pitre, director; Sharon West, script girl; John Scott, sound; Michael Givens and Richard Bowen, camera.

optical sound tracks became popular, in order to accommodate the side of the film for the soundtrack, filmmakers invaded part of the negative that would normally have been used for storing picture information. This became a standard in the industry, along with reducing the camera's aperture to conform to this standard. The normal 1:85 negative uses approximately three-fifths of the surface area of the negative. Since a foot of raw stock costs about \$.30, this means producers using the standard format are wasting almost half the money they've slated for stock.

With the new Super 1:85, much more of the negative is used. There is 41% more image area available to the cameraman. In order to maintain the 1 to 1:85 ratio, the image space on the top and bottom of the negative is also larger. The advantage of this is less

grain, and a higher quality picture that can withstand the many generations it must go through in order to get to the release-print stage.

The obvious question here is, what happens to the sound. The film is reduced down to the standard 1:85 (or to TV format) for release prints before the optical soundtrack is composited. The lab can reduce the picture from the original optically on to the master positive on to the standard Academy format, or it can print the original negative contact full aperture and record all the information on the master as it appears on the original, later reducing the picture size in printing the dupe negative. This optical reduction reduces grain structure and improves the overall acuity of the release prints.

The cost of using Super 1:85 is minimal. The camera rents

Vigilantes ride at night, torches reflected in swamp water.



for \$125 extra a week. Developing and dailies cost the same as always. The only additional cost is in reducing the interpositive or the internegative. DuArt Labs in New York, which processed *Belizaire*, charged a one-time fee for the entire film, and according to DuArt, this fee should be no more than \$2,000.

Clairmont Camera modifies its 35mm Arriflex BLs and Arri 3 cameras for Super 1:85. With the normal 1:85 format, the lens is offset to one side (by 1.25mm). With Super 1:85, Clairmont centers the lens and opens up the aperture plate. Clairmont also modifies the ground glass.

Another advantage for both the producer and the cameraman, is that the top and bottom TV borders on the ground glass of the Super 1:85 format are approximately the same as the top and bottom borders of theatrical 1:85. "With standard 1:85, the borders are .446-inch tall, which is a considerable difference," says Denny Clairmont. Since more and more features end up on TV or videocassette, Super 1:85 will extend the life of a picture and increase its value. It also makes scanning for TV transfer easier.

Super 1:85 allows the cameraman "to compromise less when he's shooting. He no longer has to compose for two formats, and he can concentrate more on composition and worry less about borders," says Richard Bowen.

"We never used a Steadicam. Everything was right here on

my shoulder. We shot with 1000-foot mags on a BL (which weighed 73 pounds). When we needed a dolly shot, I'd just walk along. I work very hard at staying in shape for this. I do Nautilus and Tai Chi and run. The trick to hand holding is to do it with your pelvis and with your legs. Not to do it with your upper body. You can pan, tilt, walk, and do everything with your legs. And you try to keep rigid from the waist up. What I love most about hand-holding is that it makes shooting kinetic and physical. There's a sensuality in shooting that you don't get when the camera is locked off on a dolly. It makes the movements of the camera human rather than mechanical. It makes shooting like a dance."

Bowen used an Arri 3 as a wild camera. For lenses, he used high-speed primes and a 5-1 Cooke zoom which was needed for only two weeks. Bowen believes he could never have shot hand-held "without a terrific assistant. My focus-puller was Michael Givens. I used to call him my 'pinball wizard.' We did a dance sequence where we kept following the actors around in 360s. We must have shot five magazines on that, alone. All we did was go around in circles. This was all hand-held. I could never have done this kind of shooting without a very good focus puller."

Only a handful of scenes in *Belizaire* were shot on a tripod. Bowen locked off the camera when he felt hand-holding would

intrude on a scene. He also used it when he needed the zoom lens during a cattle roundup and a chase sequence "where we did a lot of long lens chase footage through backlit forests." Bowen also rigged up about ten feet of surgical tubing to the side of a van and hung the camera on it so it floated like a Steadicam. He did this on a tracking shot of horses. For Bowen, "it was interesting being around horses. This was one place hand-holding worked well. There was less equipment around, but you have to be very careful. Once during shooting, a horse broke out of its pattern, and ran right towards the camera. His rider got him under control at the very last second. I was close to bailing out. He missed me by about eight inches."

In the murky waters of Lake Martin swamp where Bowen filmed another chase, he hand-held the camera both in the water and in a boat when he needed the boat to act as a dolly. The crew tied the boat's bow line to a tree 60 feet away, and a grip stood in front of the boat and slowly pulled the line. When they finished that set-up, Bowen donned chest waders and got down into the water. But before doing this the first time, he saw one of the local grips standing in the water, hitting it with a stick. Bowen yelled, "What are you doing over there?" The grip called back, "Come on over." Bowen paddled the boat over and looked down. "A few seconds later, a little thing stuck its head out of the water. It looked like a turtle's head. The grip hit the water with his stick again, and the head disappeared. I said, 'What's that?' He said, 'water moccasin.' From then on, I made sure everybody else got in the water before me and surrounded me with sticks while I shot. There were alligators in this swamp, too, but the noise we made chased them away."

Another stylistic decision Bowen made, was to work at very wide apertures, even in the middle of the day. "In the 1850s - the days of Matthew Brady - formal portraits were shot with a very

narrow depth of field. The person was in focus, and everything behind him was fuzzy. Shooting at wide apertures helps give the film a period look. During the day, in the bright sun, I'd work with ND 12 filters and shoot at 1.4 or 2 on superspeed lenses outside."

In terms of filtration, instead of 85s, Bowen used coral filters. "I used coral filters 2,3,4,5,6,7. If I wanted to warm a scene, I'd use the higher numbers. If I wanted it to go a little blue, I'd use the lower numbers. A side benefit of this was that it allowed us more control of continuity. I didn't start with this in mind, but as we were shooting, I discovered continuity was a real problem. We shot in the spring. At that time of year in Louisiana, the weather is as bad as I've ever seen in terms of lighting continuity. We would have days where in one sequence, the light would fluctuate two to three stops per shot. We'd start out in the morning, and it would be overcast and foggy. By 10 a.m., it would clear up and the sky would be a searing blue. This is hard, hard light. By early afternoon, these big, thick, puffy clouds would blow over, and everything would go flat.

"If you get to the location at the right time of day, you don't have to do much of anything to it. It's just ready for you to shoot. If you get there the wrong time, you need all kinds of equipment if you have to change the light. One thing I do, is I make up these charts that are based on data which engineers use to build solar homes. I can take any latitude in the world and any day of the year, and I can plot out the arc of the sun - when it breaks the horizon, how many degrees it goes up, and exactly the track it follows. What I did for *Belizaire* was make a chart that everyone could understand. When I was scouting, I could go to a particular location with this chart in my hand, and if I knew the date we were talking about shooting there, I could say, 'okay, at 10 a.m., the sun will be right there,' and mark its location on the chart. I knew exactly where it would be,

so I could predict where the shadows would fall. I was able to say when we went in, 'look, if we shoot this between 9 a.m. and 10 a.m., I don't have to do anything. We just come in and shoot. But if we get here at 3 in the afternoon, I'm going to have to put a big shelf over there and a tent on the side and change the light. And that will take an hour of set-up time.' I did that on every location we went to."

Bowen does a very thorough script breakdown. He lists every location with scene numbers, and describes what happens there. He breaks each location down by the time of day, in order to know what the basic look of the scene should be in terms of light and action.

There were sequences in which Bowen used silks; but he used them more often to keep the light quality as though it were overcast when he had to shoot in bright sun. He would put up a 20' by 20' silk shelf to soften the light. As the day went on and clouds formed above, he'd unlace the silk.

"By working at such wide apertures, as we started to lose light at the end of the day, or if we wanted to start early in the morning, I would control exposure by controlling my neutral density. I had 3,6,9, and 12 ND filters, so I could control four stops of exposure on either side. I'd shoot an exterior at F2, and as I started to lose light I'd just change from ND 12 and put in an ND9 to an ND6 to an ND3, and finally I'd be at F2. Yet, if you look at it on the screen, it's a very good match. So we never had any matching problems. And with the coral filters, I would decrease them in increments also as the day went on and the natural light became redder and redder."

Stylistically, Bowen preferred to work at low light. "The reason for that, especially on a lower budget, is that it's much easier to make the light seem natural. We didn't want anything to look lit. If I couldn't light with a single unit, at least I tried to have it appear that way. For example, the scene where *Belizaire* is in jail, I

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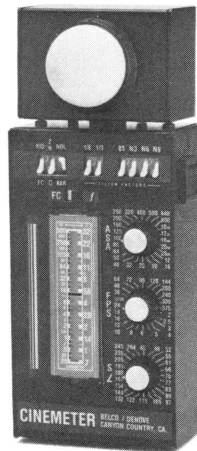
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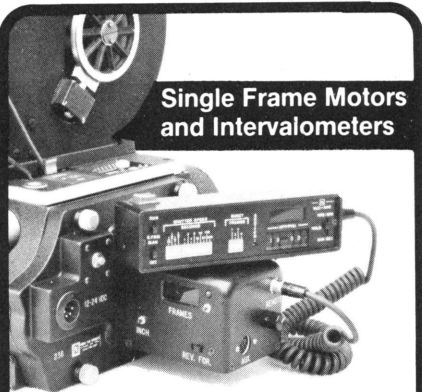
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took one 4K HMI light, put two sheets of foamcore on the ground, and I shot the HMI into the foamcore so the actors were lit from underneath. The idea behind this was that a shaft of light was coming through a window off-screen and hitting the floor, lighting them from below. Another reason for working in low light is that it's much easier to get a natural effect if you take light off rather than put it in. A big part of what a cinematographer does, once he decides what he wants the scene to look like, is to compress the tonal values into a range where they will be accurately and effectively produced on film. A cinematographer is always putting light in, such as fill light, or taking off unwanted highlights. It's faster and cheaper to take light down rather than bring it up. By taking light off, you're lowering the light you have to work with, so you end up working with wider apertures all the time."

The lighting package for *Belizaire* included two 4K HMIs, two 2500 HMIs, two Inkys, two 2K and four 1K open-face lights. They also used photofloods.

In the dance sequence, which was an interior shot during the day, the crew had to tent in the building to keep light out. They used black vinyl plastic, a material gardeners use to prevent weeds from growing. This material is less expensive than duvetine, "which we would have used on a bigger budget because duvetine breathes and you can ventilate better. The building looked real interesting wrapped up in black plastic. It looked like something the artist Cristo would do," says Bowen.

The reason the dance sequence was shot during the day was that there were children in the scene. The exterior day-for-night shots were stylistic choices of Pitre and Bowen.

"Day-for-night can give a surreal quality. It's an odd look that doesn't produce rich blacks. Most people don't realize these scenes were shot day-for-night, but they do know something is different. We used it for the whipping scene. We could have shot at

night, but we didn't think it would have worked as well, and it would have been harder in terms of our schedule."

According to Bowen, one of the standard ways of shooting day-for-night is to pull the 85 filter so that the ambient light goes blue. Then, by underexposing and using a rimlight or side light, there is a sense of moonlight.

"What we did was use the location in the forest which had little shafts of light coming through the canopy cover. We put on the equivalent of a half-85: a coral 2. I thought the scene should look cool, but not overly blue. A coral 2 doesn't allow the light to go as blue as it normally would by pulling the 85. We took the sheen off the foliage with a polarizing filter. A Blackdot filter took down the highlights and diffused the image. I also used an ND 12. And we shot wide open which gave us the narrow depth of field you almost always have in a night scene.

Bowen used 600-watt tungsten light bulbs in period lanterns which were carried by the actors in the whipping scene. He mounted the bulbs with plaster of Paris. "I needed 600-watt bulbs to overpower the daylight because I was using so much neutral density. When people looked on while we were shooting, they got very nervous. The actors would stand in front of the lens, and look like their faces were burning up. But I had measured the 600-watt bulbs and I knew how much light they gave off. I knew the lanterns had to be two stops higher than the ambient fill light. We did end up putting dimmers on the lanterns because the 600-watts proved to be a little too bright. But the balances were right. And the use of tungsten light gave the lanterns a warm feeling."

Bowen used torches for the night shooting. He and his crew experimented with the fuel mixture. They mixed together two-thirds kerosene and one-third diesel fuel. They soaked rags in the mixture and tied them to the end of sticks. "That gave a light that was the right color temperature. The diesel fuel made them smoke,

so when we raked them with some backlight, the camera could read the smoke. The mixture allowed the torches to look more realistic than if we had just soaked them in kerosene. Kerosene is such a pure fuel, it gives off no smoke. It also burns so hot, the color temperature isn't red enough. When the vigilantes carried the torches on horseback, we cross backlit them with open-face 1Ks. That's what made the smoke show up. I also shot these scenes with someone on each side of me holding torches to give a little front fill light. I had them walk with me while I hand held the camera."

Recreating 1859 wasn't all that difficult for the crew. The Louisiana locale lent itself to the period. Much of the production was based in and around Lafayette. Although Lafayette is a very developed suburban town, one of its main attractions is Acadian Village, an authentic recreation of an 1850s Cajun town. It contains 12 period houses that surround a man-made bayou. Each one of these homes was brought from the countryside and restored. The village also contains a country store, a church, and a variety of workshops. This is where a large part of the movie was filmed.

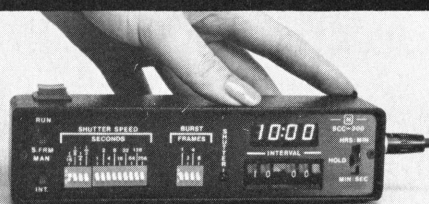
To prepare the village for shooting, the roofs were covered with palmetto thatch or cypress shingles. Porches, chicken coops, and sheds were constructed. Holding areas for livestock and vehicles were built. Tons of dirt were hauled there to cover the sidewalks.

One of the problems Bowen faced in the village was that in order to remain faithful to the period, he couldn't film it as it appeared. Part of the Cajun social structure was based on the fact that people lived great distances from one another. They lived in the woods and saw their neighbors only at dances and at church.

For Bowen to shoot the exteriors of the homes in the village, and yet make them look as if they were in secluded areas, was a challenge. At most, they were ten feet from one another. Bowen

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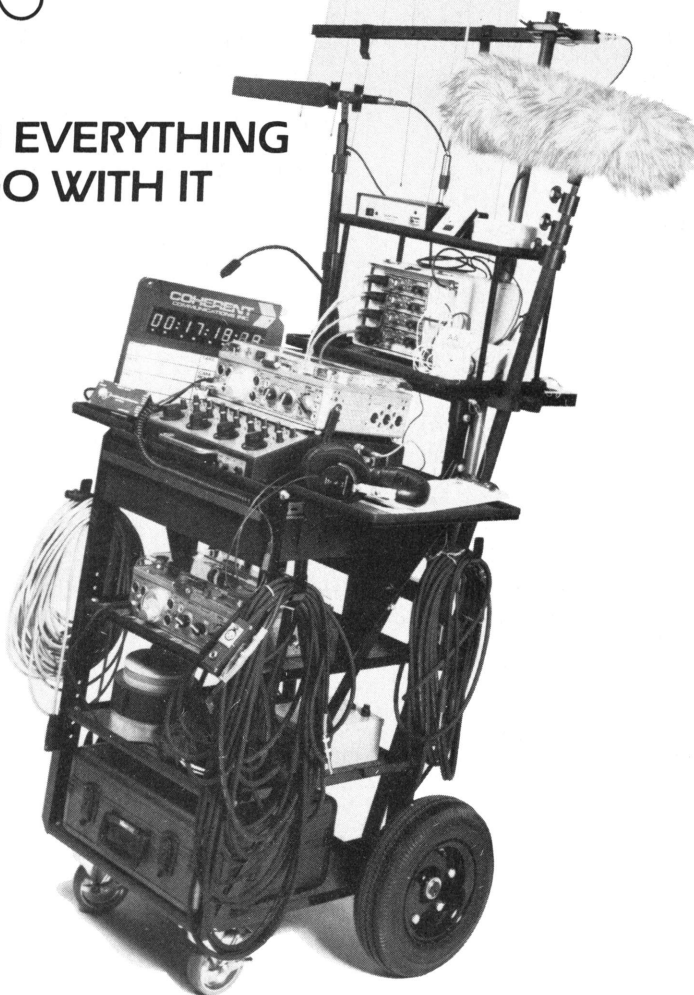
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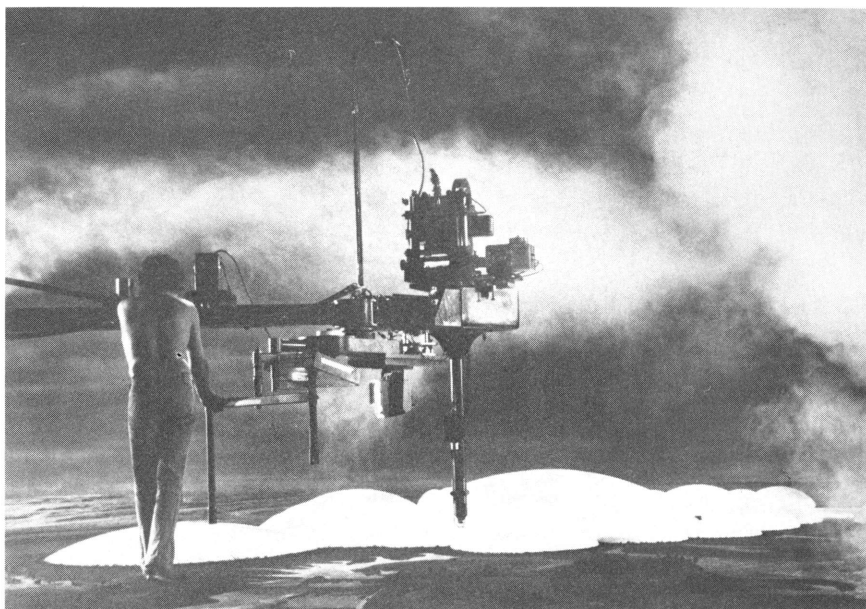
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"drove the art director crazy" because he "was always asking for tons and tons of trees and foliage to block out the other buildings as well as telephone poles."

This was also a problem for him in shooting indoors. "Cajuns didn't have glass on their windows in 1859, and we wanted to keep that authenticity. But we could see out the windows. We couldn't use neutral density gel to block the view, and we didn't want to put anything over the windows because we wanted the curtains to blow in the breeze."

Bowen took 12-foot by 12-foot nets and placed them perpendicular to the ground ten feet from the windows. "We shot right through the nets, and the background was enough out of focus, we couldn't see the net material. It also allowed us to bring down the exposure outside without having to put anything over the windows. And, we could let the breeze come in. This worked very well, and didn't cut down the level inside which ND gel does." In addition to using shrubs to cut telephone poles and buildings from the view of the camera, the crew stapled seamless blue [still photographer's] paper on the facades of adjoining buildings to erase them from the camera's eye. Bowen shot right into that, and it appeared as blue sky.

The main obstacle throughout the entire 36 days of shooting, was time. An average day contained about 20 set-ups. The record day contained 42. But because there were over 75 bit players and extras, period costumes, and scenes with animals, much of the time was spent in pulling everything together, and not in actual shooting.

Belizaire, on the whole, is a major triumph for its principals. It is the first "green" or "gumbo Western" ever made. It is the first film that sets Cajuns in a positive light. The fact that it was produced, shot, and financed in Louisiana is extraordinary. △

Merry Elkin is a Los Angeles free lance writer and author of soon-to-be-published film books.

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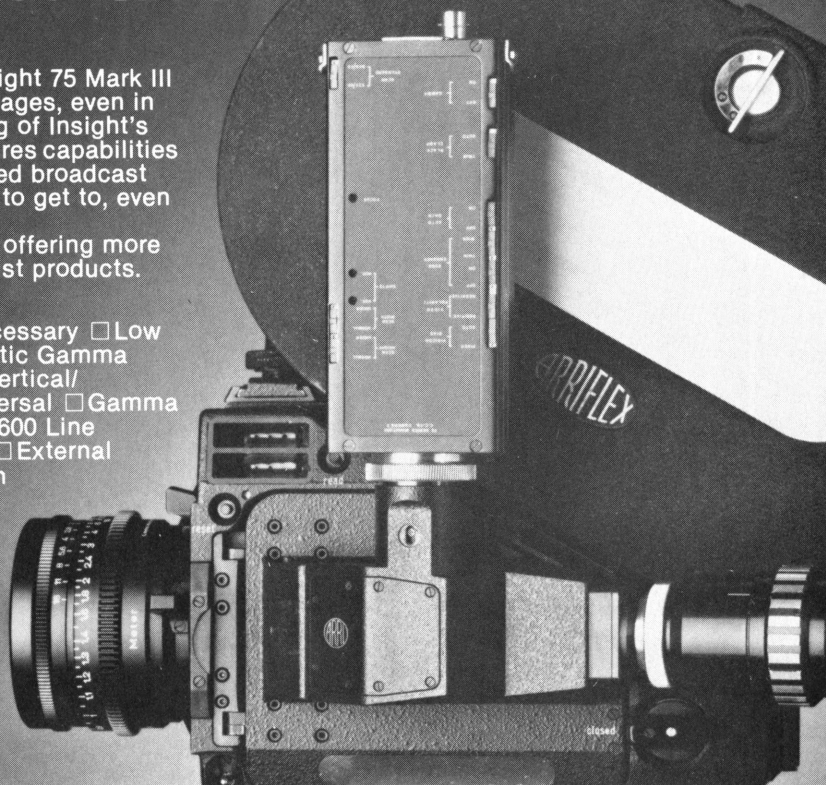
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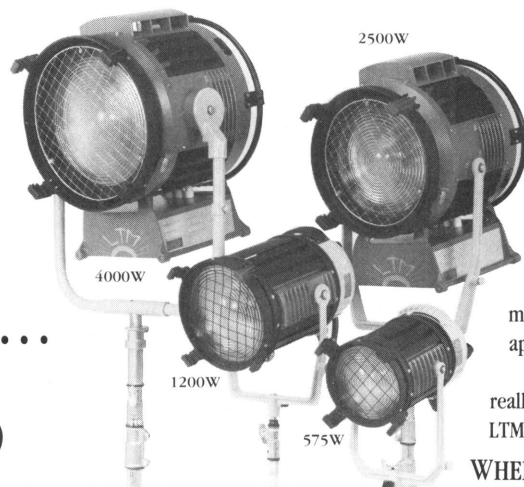
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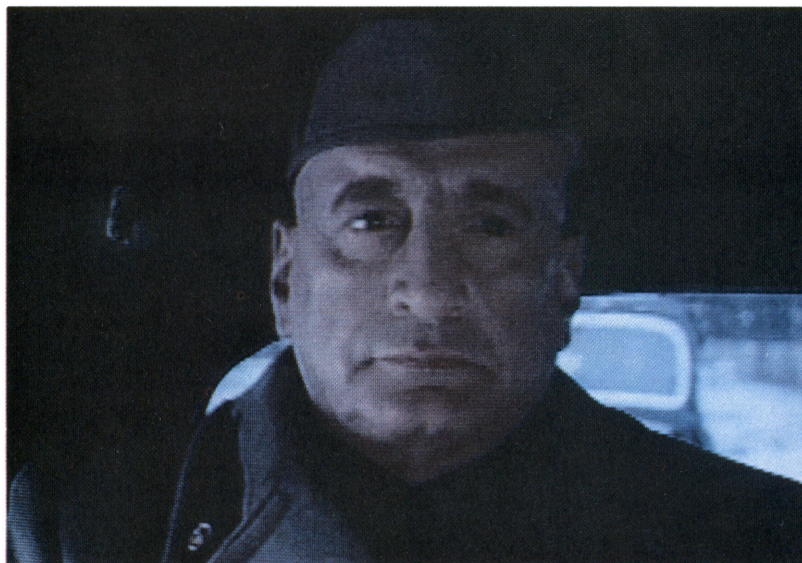
Mussolini—Electronic Editing

by Michael Stanton, PhD.

In 1922, Benito Mussolini assumed the position of prime minister and head of government in Italy. Mussolini quickly solidified his power, becoming a dictator with the support of his "blackshirt" followers (the *Fasci Di combattimento*), commonly known as "fascists." Mussolini officially embraced his ultra-nationalist neighbor, Adolph Hitler, in the so-called "Pact of Steel" in 1939. Along with Japan and other minor allies, Mussolini and Hitler joined forces to form the Axis Powers. In this way, Mussolini's dream of increasing the power and prestige of the Italian nation through foreign acquisition and aggression helped to set the stage for World War II. The world has never been the same.

Last fall, Mussolini gained prominence again, this time in an NBC mini-series entitled, *Mussolini: the Untold Story*. Produced by Trian Productions, this seven hour mini-series concentrated on the behind-the-scenes personal life of "Il Duce." *Mussolini, The Untold Story* aired over three nights and starred George C. Scott, who bears a striking physical resemblance to the fascist dictator. But as millions of viewers watched this new docudrama, they were unaware that this program was produced differently than any other mini-series.

In the summer of 1984, the executive producers at Trian Productions mulled over the requirements of the project. The production demanded a rigorous shooting schedule in Yugoslavia. That nation was chosen for the location work because it provided suitable backgrounds and the correct "period feel." At that time, the project had a signed writer, Stirling Silliphant, but no signed star or director. In addition, the project had a tentative air-date deadline of April 19th, 1985. The logistics of pulling the project together in time seemed monumental. By the end



George C. Scott as
Mussolini

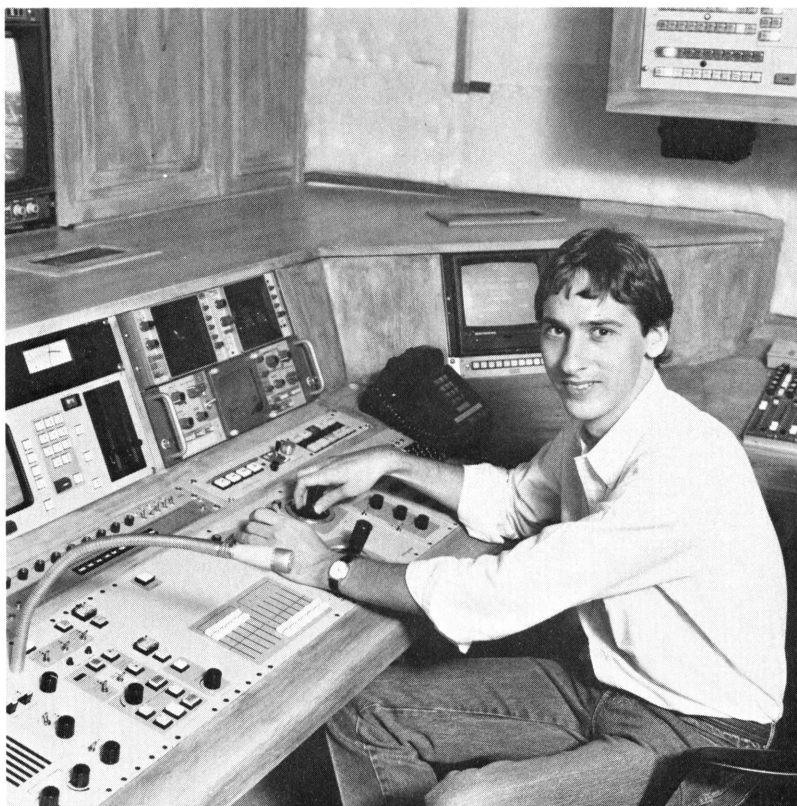
of December 1984, the delivery date for the production slid back to April 24 and then to the middle of May. Finally, the program was rescheduled for fall of 1985, providing some much needed breathing space in which to finish the production. However, the original deadline pressures led the producers to consider new means of post-production that would speed the program to air as scheduled without increasing costs.

In post-production discussions, executive producer Ray Katz proposed that the entire project be edited on videotape, a medium he had used successfully on other projects. To investigate the feasibility and financial costs of videotape post-production, Trian contacted Complete Post, Inc. in Hollywood. Complete Post possessed a great deal of experience with other film-to-tape projects. In fact, Complete Post pioneered editing film shows on videotape, including television series such as "Fame." The feature film *Oh God, You Devil* was also edited on videotape at Complete and then reconverted to film for distribution. According to Andy

Zall, vice-president of operations at Complete: "They (Trian) talked with us about it. We laid out a basic game plan of how they should do it. They then went away for about a month or month and a half and came back with a decision to try it for video." By editing in videotape, Trian anticipated about a 30% savings in time and money.

While committed to the idea of video post-production, Trian decided to shoot the mini-series on film. All film footage would be transferred to videotape for editing, and the production would be left in this video form for network airing. Complete Post did the film-to-tape transfers. Normally, television series remain on film through the editing process. The networks then have a videotape copy of the completed film made for airing. *Mussolini: the Untold Story* became the first mini-series, and largest single project, completely assembled by means of electronic instead of physical cutting. As Zall said, "Nothing like this, of this length or breadth, had ever been done before."

Chris Devlin at the console in Complete Post's telecine department.



Realizing that few film editors had experience with electronic editing systems, Complete Post understood the need for communication and an early education process. Numerous planning sessions covered every post-production eventuality. According to Neal Rydall, vice-president of sales and operations for Complete Post, the electronic editing techniques called for professionals willing to grow by learning new procedures. "It does take the right group of people in order to do that," said Rydall, "and on *Mussolini* they had that."

Filming of *Mussolini* began in December of 1984. All film was shipped back to Hollywood for transfer to videotape and initial editing. In the case of "Mussolini," film negatives took five days to be shipped from Yugoslavia to Hollywood, so the producers printed the "dailies" for review purposes before shipping the negatives. Thus, shooting decisions could be made immediately without disruption of the on-going post-production process in the United States. Gradually, more and more film filtered back to the U.S. until the program material nearly filled 63 one-hour-long, one-inch master videotapes.

Complete Post supplied Trian with editing space and secured two off-line editing systems for full-time use as well as a screening system. During the transfer process, three-quarter inch cassette copies (similar to film work prints) were also reproduced for the off-line editing systems. The three-quarter inch copies then went to the editors who assembled the program. With the aid of the off-line equipment, the editors made their cut and generated an edit decision list (EDL). Edit decision lists consist of a series of time code numbers (similar to film edge codes) showing the marked in and out edit points which are stored on computer disc for later retrieval and use.

Eventually, these versions of the program underwent a series of re-cuts. Different versions evolved through the director's cut, the producers' cut, and the network's cut. By July, a final version of *Mussolini: The Untold Story*, was ready for on-line editing. In on-line, the program was assembled with all special effects such as keys, wipes and dissolves added at that time. By late July, the on-line process had been completed. The program was essentially finished. Scoring, audio sweet-

ening and dubbing concluded by early September.

A similar project edited on film might involve a crew of five editors and a team of assistants with more brought on as work load and deadline might dictate. Long hours for the team would also be involved. For *Mussolini* three editors did the actual off-line cutting. Since there were only two editing systems, only two editors worked at any one time. The editors operated a regular five-day-a-week schedule of eight-hour shifts with no overtime. Pressure was minimal as compared to similar film projects. According to Noelle Imperato, an experienced film editor, "Because of the pressure that you have in film, everybody would be nuts by now. Here I have to say that everything went extremely smoothly."

For supervising editor Ronald Fagan, this mini-series became his "first experience with videotape of any nature." After only a few days of instruction on the electronic editing system, Fagan felt comfortable enough to perform edits by himself. Fagan eventually edited about one-third of the mini-series with fellow editors Rod Stevens and Imperato editing similar amounts. Not only did he find videotape editing to be faster than film, he found it to be somewhat exhilarating. As Fagan described it, "We use the time in film that we are pulling down the trims to think. In video, you have more time to think, because you have less time for fishing around. You can make your decisions faster . . . With videotape, there is a feeling that you are freer."

One explanation for this sense of control might be the exacting system of organization used for the project. From the start, the editors agreed on a three-digit labelling method to distinguish parts from acts and acts from takes. As Imperato explained, "If I see a cassette here with, say, the number 317, I know it is part three, act one, cut seven . . . There is never a worry or a question about which cassette to use . . . This could turn out to be a nightmare. There are a total of 25 acts. Each one had been shuffled, going from one part to the other, one act to the other." The editors also instituted a color-coded method for indicating the generation (the number of times a tape has been copied) of the off-line work masters.

Due to the nature of computers which control the machines and remember the cuts, the videotape editing process requires an increased attention to detail. This somewhat disturbed Fagan. "If there was one thing in the process that started to irk me," said Fagan, "it was the preparation, until I understood it. It seemed like, boy, there are a lot of numbers, but then I realized that it is a necessary process." The computer required certain information and certain commands before the editing process could begin. As Fagan explained, "Like any computer, it is a step-by-step process. To get what you want up on the screen, you have to do certain things in order. If you do them out of order, the computer says 'no, no.'"

But, with videotape, the editors found that they could just pop in a cassette and immediately try an edit. As Fagan related one case, "Eventually, there comes a time when the director says, 'Do you think that the close-up reading is the better reading?' And the film editor says, 'Well, we could print it up.' But, the director often says, 'Nah, let's leave it alone.'" Fagan indicated that film editors are often unaware that their hesitation often limited creative opportunities. But, in videotape editing, Fagan realized "We would be sitting there and Billy (director Billy Graham) would say much of what I have just

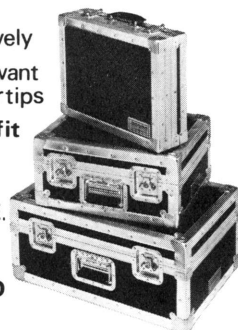
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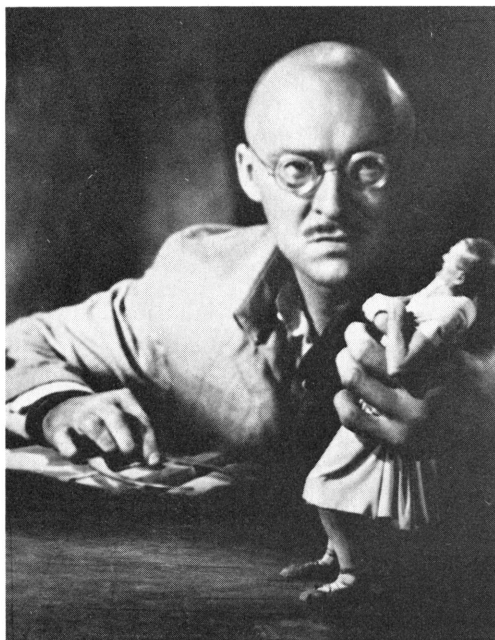
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related. And I would say well why don't we have a look? Let's get the dailies, because they are in the cassettes. All we have to do is feed them into the machines and presto, there they are."

The editors of *Mussolini* disclosed that they made more editing decisions than they would have with film in the same amount of time. As Imperato discovered, "We went through a lot more recuts and we went deep into all the dailies looking at every piece we felt like looking at. I think this helps a lot." Since editing is a matter of choosing - of selecting and shuffling takes - the editors felt the possibility for more creativity in the videotape editing process. Tape provided a greater ability than film to try alternative editing decisions before arriving at the best cut. Ron Fagan sensed the process as being more cerebral, by being "able to think directly from your head to the screen."

The sense of increased creativity on the part of the editors of *Mussolini* matched the overall feeling of success in the production team. Triun Productions completed the production on time and within the projected budget. Through its help and facilities, Complete Post provided the film industry with an improved, cost-efficient model for producing large-scale television programs. The process of editing film programs on videotape can be expected to become widespread in the years to come. Ironically, everyone involved with the production realized that the public who watched this mini-series never noticed the differences that make *Mussolini: The Untold Story* a first in its genre. △

Michael Stanton, Ph.D. is an assistant professor of Radio-TV-Film at California State University, Northridge.



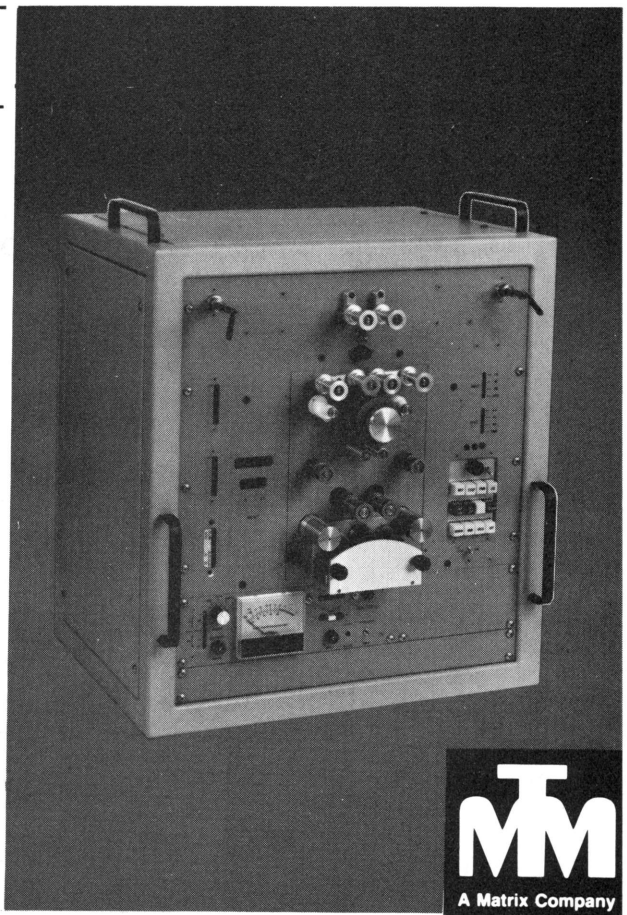
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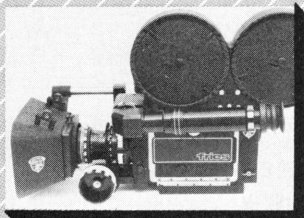
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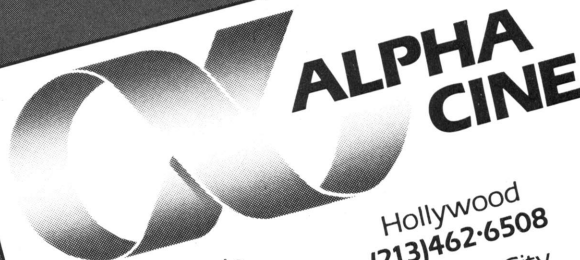
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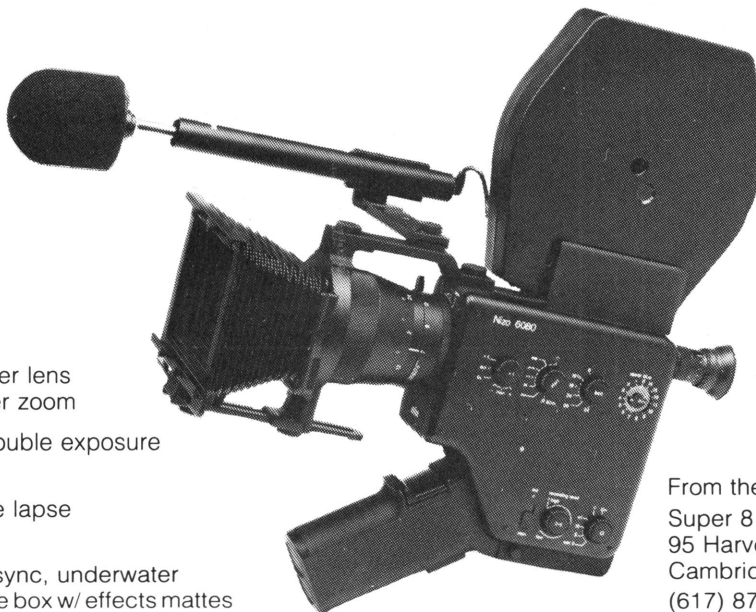


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173 Precious Images in 6½ Minutes

by Robert S. Birchard

The small preview audience spontaneously burst into applause. "My God," said director George Sidney, "it's like seeing your whole life. There isn't anyone who hasn't lived through some of it. It's a part of our culture."

A screening for exhibitors (a noun often preceded by the adjective "hard-nosed") at ShoWest brought a thunderous ovation, and a showing for the "art house" crowd at the Los Angeles County Museum of Art saw a similar reaction. Yet the film, *Precious Images*, which filmmaker Chuck Workman describes as a celebration of the movies through iconographic images, is a scant six and a half minutes long – barely long enough to allow you to settle back comfortably in your chair!

Precious Images is being seen in theaters this summer, giving the widest possible audience an opportunity to share the experience. More than a mere compilation or "clip show," it gives one the chance to live again many of the movies' magic moments.

What can you get in little more than half a reel? The answer is a lot – a stoic Ma Joad riding off to California in *The Grapes of Wrath* . . . Dorothy and her friends on the yellow brick road . . . Lillian Gish rocking the cradle in *Intolerance* . . . Orson Welles whispering "Rosebud" . . . Dustin Hoffman as *Tootsie* . . . Scarlett O'Hara returning to the red earth of Tara. *Precious Images* contains moments from 458 films, some as long as several seconds – many as short as eight frames, and was produced as a "gift for the audience" by the Directors Guild of America in honor of the Guild's fiftieth anniversary.

"But *Precious Images* is not a film about directors, it's about the movies," says Workman. "We chose shots for their visual impact, for their iconographical aspects. The movies are a collaborative medium and you can't separate the contributions. Cin-

ematography, acting, editing they're all a part of it."

The genesis of the project is lost in Workman's sub-conscious. "I knew you were going to ask me about that," he says, "but I don't really remember. I wanted to do something for the Guild's anniversary. I didn't want to make a long film, but because I've made so many trailers I felt you could capture the essence of a memorable film in as little as a single shot – if you chose the shot carefully enough."

Originally planned as a three minute trailer of 2 and 4 frame subliminal cuts, Workman presented his idea (along with a detailed budget) to the DGA Golden Jubilee committee, chaired by Robert Wise, and he was given a green light on the project.

The first order of business was to select the films to be included, and as a starting point lists were compiled of all the DGA award winners, all

the Academy Award winners, and the highest grossing films of all time. David Shepard, the Guild's special projects officer, prepared a list of historically important films, and Workman paged through a film yearbook or two to make sure that no significant film was left out.

"We also wanted to consider films that had an impact in their time – films like *Shaft*, *Fritz the Cat*, and *Enter the Dragon*. Then for awhile," Workman recalls, "I'd be walking around – or I'd get up in the middle of the night and I'd suddenly flash" *Norma Rae!* And I'd write it down on a piece of paper. Then when I woke up there it was on the paper, and we'd put it in."

"We ended up with a list of 707 films, and then we passed the list around and asked people if we'd left anything out. I'm glad we did, because someone mentioned *20th Century*, and



At the editing table, Chuck Workman views a clip of James Stewart in *Mr. Smith Goes to Washington* (1939).



Above: A stone idol comes to life through Ray Harryhausen's *Dynamation* technique to duel with John Phillip Law in *Golden Voyage of Sinbad* (1974). Right: *The tragic lovers of Wuthering Heights*, Heathcliff and Cathy, portrayed by Laurence Olivier and Merle Oberon in the 1939 classic.



I'd missed it. My son was the one who pointed out that we didn't have *10*. The list expanded to 743 titles, and then we started to gather the clips."

Going through 700 plus features would be a monumental task, especially since Workman would be editing the film himself with the aid of only one assistant. To make life easier he first turned to existing compilation films to draw his material. *That's Entertainment*, *America At The Movies*, *Life Goes to the Movies*, *Terror in the Aisles*, and Workman's own award winning educational series *Directors at*

Work provided him with a quick review of the films he wanted to include. Trailers were another source for quickly accessing the material since the trailer makers (often Chuck himself) had already culled the most memorable shots to pique audience interest. For about a hundred titles it was necessary to go to the features themselves since "condensed" versions did not exist or were unavailable.

"I'd tape off the sections I wanted," says Workman, "never more than a few feet, and we made our work print. I hung the individual shots in my,

trim bin under very general categories like: Westerns, action pictures, 2-shots, stars, classics, kisses, comedy, and several others, and then I started to put it together."

As he worked, it became evident that the 2 to 4 frame cuts were really too short. Even though the cuts would register, it was determined that 8 frames was about the shortest cut possible to achieve a meaningful impact.

"The thing that was exciting was seeing the film come together. The cuts create something new – suddenly there's a new meaning in the material. It's interesting to see Marlon Brando in *On The Waterfront* and suddenly it's twenty years later and he's *The Godfather*. And there's some fun too when we cut from the parting of the Red Sea in *The Ten Commandments* to the waves crashing over Burt Lancaster and Deborah Kerr in *From Here to Eternity*.

"I wanted to keep the film under six minutes, but I couldn't. Toward the end I felt it was just getting too long and I cut a lot of films out. Then I came to my senses and put them all back! John Santos, my assistant editor, knew where all the films were. I'd just have to say I want it and it appeared as if by magic. Lois Anne Poland helped in the selection of the clips and the editing and served as another pair of eyes."

As the film was being worked and re-worked it was necessary to get all the material into 35mm negative. Since the titles chosen spanned eighty years of movie making there were numerous technical considerations to be dealt with. Gaining access to original negative, and fine-grain, lavender, or I.P. material would be a virtually impossible task for so many films. In fact, a number of the titles to be included seemed only to be available in 16mm.

The decision was made to use release prints as the master material for the dupe negatives. Workman had recently completed a project titled *Stoogemania* for which he had to use existing print materials, and he was familiar with the problems and the possibilities.

"On *Stoogemania* we'd used low contrast stock for the duping from positive prints, but on *Precious Images* the optical house used low contrast filters to cut down on the contrast build-up inherent in duping. The optical layout

was done by Steve Brewer, Fred Griggs, and Richard Levine at B/G/L Post and the dups were shot by Cinema Research. CFI developed the dailies, and De Luxe made the release prints.

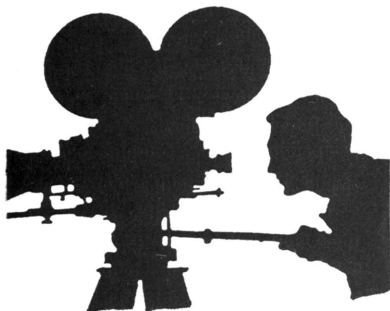
"One thing I was especially impressed with was how well the pictorial quality held up. Some of the material was probably tenth generation by the time it wound up in our negative. It is a tribute to the work of the original cinematographers and to the technical advancements in duping stocks over the past few years that *Precious Images* looks so good on the big screen."

As with any compilation project, clearing the rights to use the clips presented its own set of frustrations.

"Sometimes we'd have to make eight phone calls and write two letters on each clip. But generally because of the nature of this film and its intended use, everyone was cooperative, and Robert Wise was often able to help us find the people who could give the final okay to grant the clearances. All of the other guilds were cooperative, and so were all the studios."

For Workman *Precious Images* was obviously a labor of love. "When I was a kid in the '50's I must have seen *Scaramouche* seven times; I just loved it. Later when I started working in the business I was able to work in every area. I worked for a production company that made toy commercials, and my first editing was a 60 second spot with 70 cuts in it."

He laughs. "... I haven't changed my style in twenty years!" △



Things to Come . . .

Poltergeist II will occupy a goodly portion of our July issue. We will have a story about the cinematography, an interview with Andrew Laszlo, ASC, and interviews with Boss Film crews who created the special effects. We will also include a story about the sound for *Poltergeist II*.

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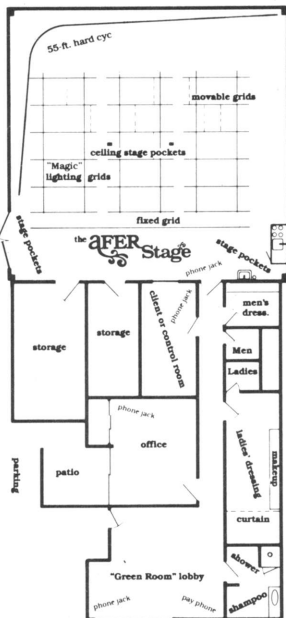
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Digital Recording in the Field

by Lawrence Loewinger

Though this article describes some unusual film projects it is really about new technologies which make them possible and how these technologies can be combined to produce extraordinary results. A few words about technical terms and machines: Sync reference refers to the time based signal, usually generated by a crystal oscillator that locks, resolves or slaves the speed of one machine to another or the speed of one machine to several others. Sync reference equals time base. The standard sync reference in film is neo-pilot tone sync pulse or its more recent variant, FM stereo sync pulse. Both are simple sync references. SMPTE Time Code uses a time base as its reference to generate time information which can be read visually. While the film sync pulse can only lock machines together, time code can both lock machines together and provide a continual read-out of the exact location on film and/or audio and video tape. From a film point of view, on the set time code acts as a combined sync reference and slate and in post production as both a sync reference and as electronic edge code numbers. For all practical purposes, the Sony PCM-F1 is the equivalent to the Nakamichi DMP-100. Both are PCM processors and both are manufactured by Sony.

Drums Across the Sea, my Cuban adventure, is a film about the roots of Afro-American music. Directed and photographed by Les Blank, famous for many music films and *Burden of Dreams*, the behind-the-scenes glimpse at the making of *Fitzcarraldo*, this project took us a mere 90 miles from Miami but into a very foreign world—Cuba. This was an ambitiously conceived project to be shot in Super 16mm and to be recorded with as large a multi-track rig as we could squeeze onto the charter airplane. Remember, there is not air freight between the United



Horowitz is amused as Albert Maysles perches above on a special rig constructed to provide an overhead view of the pianist's fingers. David Maysles stands at left.

Photo by Larry Loewinger

States and Cuba. The centerpiece of our audio set-up was the Otari Mark III/8. We surrounded it with two of the English made "Location" Mixers, 16x2 and 8x2, the latter for monitoring. We also brought a stereo Nagra for simple location work and a raft of microphones, much cable including an 8x8 multi-channel cable or "snake," Boston A40s as our monitor speakers, an RTS communications package and a video monitoring system. The latter, which allowed me to mix off the set and still see what was going on, proved invaluable.

Video monitoring is common practice for any large scale audio/video production. It is also very useful for feature work. This is not an everyday film package and, as I quickly realized, would require a permanent yet mobile installation. The Cubans offered us one of their production vehicles, a sturdy if primitive Russian truck. In a day we had transformed it into a simple mobile studio. It was neither elegant to look at nor was it comfortable to work out of but it got the job done. Where this rig was too cumbersome or there simply wasn't enough time for setup we made

do with the stereo Nagra and a simple stereo mike configuration.

The producers, Howard Dratch and Gene Rosow, together with Les Blank, had previously scouted the musical groups they wanted to film. As they soon discovered, scouting a group in Cuba and actually filming one is quite different. Some groups slipped through our fingers and others appeared to take their place. Our month long stay in Cuba was an exercise in continually changing plans and constant negotiations with the Cubans. Flexibility is not the by-word in a third world country, especially in a socialist country. Nor does a recording truck move with the alacrity of a documentary crew. The Cuban officials we dealt with were always professional and when they understood our needs, always cooperative. The countryside we saw on the streets and, from inside one of the film institute's buses, was fascinating.

As the month evolved we solved our problems and moved with ever-increasing speed. Most of the events we filmed were small ones which, whenever possible, we had

At work on the set of *Krush Groove*, Larry Loewinger is surrounded by the tools of his trade. At left is the case containing all of the digital equipment – three digital processors at top, a time code generator, and two video recorders. At center is the cart containing all of the analogue equipment.



Photo by Eric Liebowitz

staged out-of-doors. These, Les Blank filmed alone and I used the stereo Nagra. Most of the normal documentary recording was done by his perennial recordist, editor, and co-director, Maureen Gosling. For the larger concerts we used two cameras and the truck. That meant finding enough alternating current to power our lights and the truck. Generally that was easy but in one instance, when we were filming "Irakere," one of Cuba's most popular bands, I discovered just before show time that the voltage was only 90. Luckily, the band carried its own voltage regulator which it shared with us.

Though I didn't know it at the time *Drums Across the Sea* was a rehearsal for the next three projects. Our sync reference was a standard 60 Hz sine wave which we recorded on track 8 of the Otari. It was derived from the Haaflex POM Crystal Checker specially modified for the project. I devised a windscreen to house the M-S stereo microphone pair. Otherwise, everything was used as it came out of the box.

Mide-Side, (M-S), stereo miking is probably the best simple stereo technique for film and video recording as it assures you absolute mono compatibility and some flexibility in post production. The technique involves two microphones, one front facing which is

usually but not limited to a directional pattern mike and the other a side firing bi-directional or figure-of-eight microphone. Technically, the front facing mike represents a combination of the left and right channels, (L+R), while the bi-directional mike creates the difference channel, (L-R).

In practice, the front facing mike records the direct information and the bi-directional mike records the ambient information. Normally, the information is recorded as two channels of discrete mono. Making normal left/right stereo requires a matrix, a simple, single control black box. The most prevalent one is manufactured by Audio Engineering Associates of California. The matrix permits you to adjust the width of the stereo image by increasing or decreasing the amount of the L-R channel. To obtain the full advantage of M-S stereo, on location I would recommend recording tracks as two-channel mono, matrixing it into stereo in post production. For monitoring purposes, however, one should carry a matrix so that everyone can hear the likely end product.

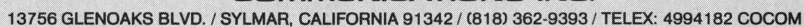
Living in the back of a Russian truck with less than state-of-the-art springs, the Otari 8-track proved to be a rather hearty little beast. Because one of the possible products from the Cuban

filming was to be analogue discs/records, I enhanced the Otari's performance with dbx noise reduction. As a noise reduction system dbx reduces tape hiss considerably but its response to transients is less than ideal. On our first night of multi-track recording I did not have time to install the dbx system. When comparing the tapes of that night with the others I have to admit a slight preference for those tapes.

There is no greater contrast than that between lawns of Tanglewood, Massachusetts, and the crowded, aggressive, sensual world that is Cuba. The Boston Symphony Orchestra spends its summer at Tanglewood. A little less than two months after I got back I received a call from Albert and David Maysles, long time documentary filmmakers, pioneers in the *cinema vérité* style, to work on a film about the noted Japanese conductor, Seiji Ozawa. If a conductor's life is music his instrument is the symphony orchestra.

Classical music is sometimes recorded in multi-track format but more generally in real stereophony and with digital equipment. In this case stereo was a requirement of the film's sponsor, Columbia Artists Management. How to square these requirements with the more limited exhibition capabilities of 16mm. Moreover, we were to do

Unlike Cuban popular music, classical music lends itself to simple stereo miking techniques. The nature of these techniques determines the degree of mono compatibility. I used the M-S technique for the rehearsals, classes and performances I covered, knowing I was giving the editor, Deborah Dixon, and the post production mixer, Lee Dichter, the flexibility to manipulate the stereo image according to the dramatic needs of the film. Max Wilcox employed a variant of the traditional American stereo technique—spaced omni microphones. The virtue of this technique is that it reproduces a more reverberant field which, in the dry acoustical environment of Tanglewood, an open shed, is advantageous. The drawback results from the fact that, unlike M-S, which relies only on amplitude changes, (loudness), to create stereo, spaced omnis depend on both amplitude and phase, (time), differences to make stereo. Spaced omnis do not collapse into mono as effectively as a co-incident technique such as M-S. Several high end microphone manufacturers are either making or planning to make single unit M-S microphones with matrixes, suggesting that this will become the dominant simple stereo mike technique.



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of the future for film and video work. In fairness to Wilcox and Newton, when I attend the film mix of *Ozawa*, I heard stereo musical performances of the Boston Symphony that were sonically splendid.

On the Cuban project the Sony PCM-F1 was little more than a glint in my mind's eye. On *Ozawa* it stood in the wings. All the large scale recordings were done on stereo Nagras with Dolby A noise reduction. The Sony PCM-F1, feeding into a 1/2" Beta video recorder, provided the digital backup. The sync reference was the standard film reference, 60 Hz, which was recorded in the normal manner down the center track of the stereo Nagras. In an unmodified PCM-F1, which we used, its crystal clock operates at the standard NTSC time base of 59.94 Hz. To insure film sync on the digital recording we laid down a 60 Hz sine wave on the analogue track of the video deck.

We now take film synchronism almost for granted. The film cameras and tape recorders we use have provided us with an extraordinary degree of reliability. But as we move more readily between film and video, as the film market becomes more international, and as SMPTE Time Code begins to replace 60 Hz sine wave as a film sync reference, synchronism is no longer a simple matter. There are some basic facts to remember. If your crystal clocks are of a high accuracy you can record using different time bases and, provided the materials are resolved to the same time base(s) at which they were recorded, they will be in sync. In practice, however, it is far better to film/tape and audio record using the same time base. That means if you want to record digitally using the Sony PCM-F1 you should modify it to accept an outside sync reference, whether it be sine wave or a video signal. The key is to know the time base, find out the post production techniques to be employed and, wherever possible, use time code rather than sine wave as a sync reference. Time code has the considerable advantage over sine wave of being a numerically visible clock, always keeping you in sync and informing you continuously of your exact location or "address." Once time code can be effectively applied to 16mm or 35mm film it will simplify set slating procedures and rapidly accelerate post production. At

that point film can adapt itself as readily to the computer as video has done.

It was many months later when Susan Froemke, the Maysles' long time producer, asked me in hushed tones over the telephone if I would show up at the Steinway piano show-room in Manhattan. So began *Vladimir Horowitz: the Last Romantic*. Horowitz is a legend in the concert world. Best known, perhaps, as a recording artist, it was a rare event to film him in performance in his New York studio and to catch him in conversation with his wife, Wanda. Once again the same production team—the Maysles brothers and Peter Gelb of Columbia Artists Management—went into action. John Pfieffer, Horowitz's long time record producer, was hired to supervise the music recording. Like *Ozawa*, the Horowitz project was intended for multiple release, but with one notable difference. In addition to a premiere stereo screening at Carnegie Hall, video cassette release and television broadcasts, we were asked to produce the materials for a compact disc and an analogue record set. The task was to make sure our technology could accommodate this multiple format release.

Logistically, *Horowitz* was the simplest of these four projects. It was filmed in one place for six days over a two week period. By film standards the hours were quite civilized. Technically, it was the most complex. We had two weeks to design a system to create a uniform time base, generate a time code whose time base and frame reference we wanted to be useable in post production and devise a stereo mike configuration which would be discrete, if not invisible, to the cameras, sound good and somehow avoid the noise the film crew would necessarily make. When I write "we" I really mean we on this particular project. The technical success of *Horowitz* was due in no small measure to the support I received from New York's audio community, film and video workers alike. Bill King and Mike Shoskes were my on-set colleagues. Jerry Bruck of Posthorn Recordings, John Hampton of Star Tech Audio, Dave Smith of Editel, Guy Genin of Zellan Optics and Paul Yaeger and David Leitner contributed their share of useful information and assistance.

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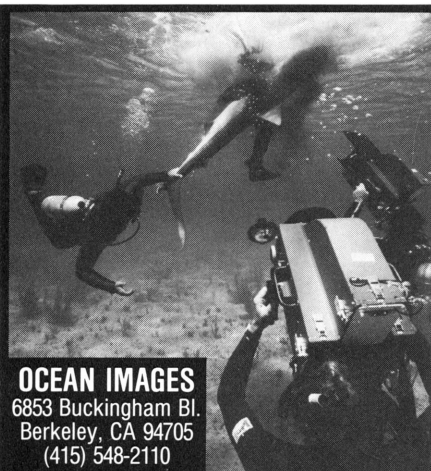
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time base we could make 60 Hz—we chose the new Nagra IV-S TC time code. We then acquired a Sony PCM-F1 modified to accept the 60 Hz from the Nagra IV-S TC as its time base. Note that most of the modifications done in New York or Los Angeles on the PCM processor permit it to accept either an audio or video sync reference. We used the Nagra IV-S TC to generate time code and sync. A second stereo Nagra was used to record the dialogue, mostly through Audio Ltd. wireless microphones. Two video recorders, one 1/2" VHS and the other a 3/4" U-Matic, stored the digital music. Two video decks offered several advantages. While one was used as backup for the other, we could also dedicate each VCR to a particular purpose. The 3/4" machine provided tapes for the digital record editing. The 1/2" machine, an industrial grade Panasonic 6800 with VHS HiFi audio, recorded the film materials. For our purposes the 6800 operated as a 6-track audio recorder—two digital channels, two VHS HiFi channels and two linear audio channels with Dolby B NR. During the shoot we maximized the audio capabilities of the 6800 for music, backup dialogue, time code and sync pulse.

The most unusual choice we made was in our miking technique.

Maestro Horowitz's studio is no larger than an ample living room. There was no way we could place mikes in the room without them either interfering with the camera crew or vice versa. The solution to this dilemma was simple. Into the piano itself went an M-S stereo pair in the form of a Schoeps boundary mic, omni directional in pattern, and a bi-directional mike. From that point on the mikes were never seen and, from the microphones' point of view, the crew was never heard. That meant that the piano sound was to be enhanced in post production much like a rock n' roll record.

While I think it was a clever solution to a vexing problem, it created its own set of problems which only became apparent further down the post production chain. In the finished film the piano has a definite ambient sheen to it. The background noise is close to inaudible. The piano was recorded digitally and then transferred to 35mm magnetic film with Dolby A for the mix. Because the Horowitzes speak softly I had to use

more than a normal amount of gain to get them on analogue tape. If you add together the noise generated from radio mics, a mixer, the Nagra, several generations of tape and magnetic film, plus the electronics of the mixing facility you get a noise level which sounds enormous only when compared to the almost complete silence behind the piano. It was really a normal noise level in all circumstances save this one. When the editors, Deborah Dixon and Pat Jaffe, brought this problem to Lee Dichter, who was once again the post production mixer, he came up with a simple solution. After a musical selection ended he would fade up the background level before introducing the dialogue. This would accustom the audience to the change in background level.

The day after I finished *Horowitz* I began *Krush Groove*, the rap musical directed by Michael Schultz and photographed by Ernest Dickerson. It was a delicious feeling to traverse the extremes of western culture in twenty four hours. Rap music is a kind of declamatory poetry set to music. At its best it envelopes you in its incantatory magic; at its worst it gives you a headache. Luckily, we had the cream of rap musicians performing for us in an intense five week shooting schedule. *Krush Groove* is a feature fiction film but with a good dose of documentary reality. Many of the performers in the film are playing themselves, telling us about their own lives. The story is of a fledgling record label and how its founders fight the battle to establish themselves and their artists in a none too perfect world. It is performed as a comic musical fantasy but not without some dramatically poignant episodes.

Michael Schultz has had a varied and productive career directing for the stage and film. On film his specialty is the urban musical comedy such as *Cooley High*, *Car Wash* and *The Last Dragon*. His gifts range from eliciting solid performances from young inexperienced actors to staging complex musical numbers. Calm and collected under pressure, he could improvise gracefully when the situation required it.

Schultz and his other producers decided to record the location sound digitally and to do all the playback digitally. They contracted with Ruxton Video in Los Angeles to supply the machinery for digital recording and

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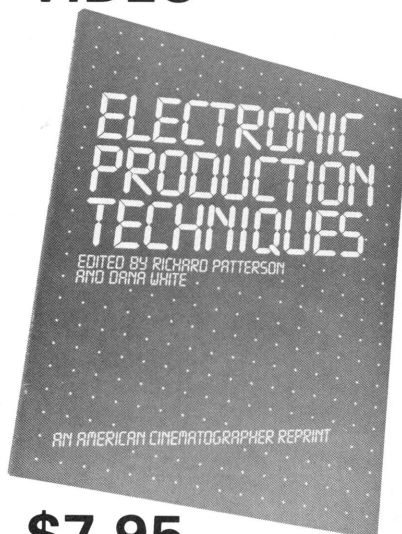
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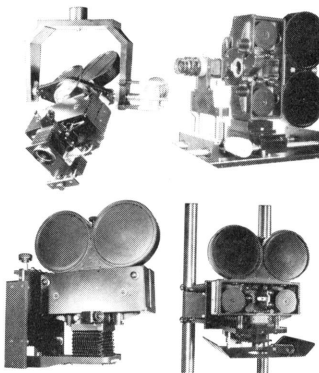
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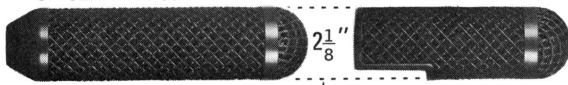
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to do the editorial services of transferring to video cassette and syncing up all of the dailies. Ruxton sent two PCM-F1 processors modified to accept an outside sync reference, two 1/2" VHS industrial video decks which resolved to an outside sync reference, a 60 Hz video generator and a small oscilloscope. The scope is necessary to verify video lock which means sync. In New York we added a time code generator and we got our carpenters on the crew to build a travelling case for all of this gear. At the outset I was skeptical that this consumer and industrial grade equipment would submit to weeks of grueling shooting. My skepticism was misplaced. I was also concerned that the sound crew, given the enormous amount of equipment we carried, would be able to keep up with the production pace. In addition to the digital equipment we were carrying a hefty cart of analogue gear plus a substantial playback system. To give you an idea of the sheer volume of equipment, we occupied as much space on the camera truck as did the camera crew and their equipment. Once again my concern was misplaced. The high skill of my crew was such that we either kept pace with production or were ahead. Each of us discovered that the application of new technology meant redefining work roles. For my digital equipment operator, Michael Cohen, working on a feature was a new experience. He grasped the technical concepts quickly and became particularly adept at doing playback from the video cassette recorder. My boom operator, Jerome Vitucci, also acquired some new responsibilities in maintaining equipment and running the sound crew.

On *Krush Groove* the Sony PCM-F1 and the 1/2" VCRs had become the primary recording and playback machines. The Nagra was now consigned to a backup role. If we lacked for anything on this job it was places to put the multitude of signals we were recording or re-recording. Often we needed - but never - had an 8-track recorder.

Krush Groove was the last of my hi-tech adventures, and it raised the most pressing questions. In it we were using digital technology to replace the Nagra and 25 years of recording practice. The first question is primary: Why digital recording in the field? Unquestionably, it has the potential to

sound better, but for dialogue work the improvement is marginal, especially when you consider the effects of the post production chain. For music and effects, however, the improved frequency response and the markedly increased dynamic range make digital audio a striking advance over analogue.

On the set the Sony PCM-F1 is a true 2-channel recorder, offering complete channel separation. That means radio mic tracks will not bleed into the boom track and a pre-recorded playback will remain completely independent of the live vocal you are recording. There are drawbacks to the PCM-F1 as a field machine. Try and read its meters at high noon. Run the digital processor and an accompanying VCR on DC and you will discover what a voracious appetite for batteries they have. The powering sequence between a modified PCM processor and its outboard sync reference is critical. The sync reference must be switched on first and inserted into the processor before the latter is turned on. Otherwise you won't get sync lock.

Digital's real potential lies in post production but only if the audio signal remains in the digital domain. Standard film post production requires about four generations of transfers before an optical print. This results in an inevitable loss of high end frequency response and a rapid increase in noise. Each of these conditions has an effect on dialogue intelligibility. Ironically, the appearance of Dolby Stereo sometimes highlights the problem. By offering an exponential improvement in the quality of music and effects and an incremental advance in the quality of dialogue recording it can heighten the contrast between location and post production sound.

Generational loss is not a problem in digital audio. It can be reproduced in principle and in careful practice ad infinitum without any signal degradation. Too, digital audio has an easier relationship to SMPTE Time Code and computer analysis than does sprocketed analogue audio. That makes it susceptible to minute, precise and flexible kinds of electronic editing. If anything, digital audio is apt to demand more skill from those of us who work in the field and offer more creative choices to those of us who work in post production. △

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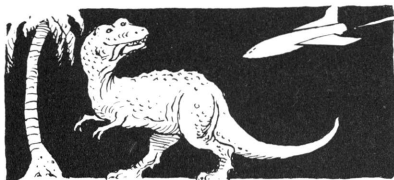
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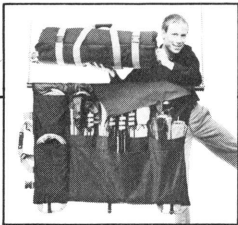
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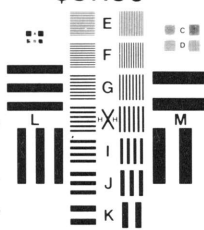
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Advertiser Index

- | | | | | |
|-----------------------------------|--------------------------------|---------------------------------------|---------------------------------|-------------------------------|
| Afer: 93 | Cinematography Electronics: 50 | Great American Market: 24 | Lowel Light Manufacturing: 2 | Rafik: 105, 107 |
| Aaton/Zellan: 44 | Cinequipt: 100 | Harrison: 84 | MacGillivray-Freeman Film: 107 | Rock Solid Productions: 50 |
| Alan Gordon: 106, 33, 87, 79, 98 | Clairmont Camera: 8 | Helix: 74 | Matthews: 43 | Roessel Cine Photo: 79 |
| Alpha Cine Lab: 90 | Coherent Communications: 97 | Image Devices: 105 | McConkey, Larry: 83 | Rosco: 100 |
| Anderson, Howard A.: 32 | Colt Helicopter: 6 | International Film Workshops: 87 | Merkel, Daniel: 108 | Rycote Microphone: 32 |
| Arriflex: 12 | Columbia College: 100 | JBK Cinequipt: 106 | Mitchell Camera Corp.: C-3 | SMS Productions: 107 |
| Audio Services: 81 | Crown International: 22 | JK Camera Engineering: 102 | Modern Pictures: 4 | Saxon Media Equipment: 106 |
| Barbizon: 98 | Desmar Corp: 80 | KE Systems: 105 | Mole-Richardson: 105 | Steenbeck: 27 |
| Bellevue Pathé: 108 | Dreamlight Images: 108 | KEM Elek/Mechanik: 19 | Moviecam Voest-Alpine: 51 | Stevens Engineering: 107 |
| Birns & Sawyer: 17, 80 | Du Art Film Labs: 11 | Keylite Rental: 10 | Multi-Track Magnetics: 89 | Super 8 Sound: 90 |
| Bolex: 20 | Ecac: 106 | Klein, Jordan: 102 | NCE of Florida: 105, 107 | Technological Cine/Video: 99 |
| Brooks Institute: 101 | Elemack: 26 | Knox, David: 4 | Nalpak Video Sales, Inc.: 106 | UCLA Extension: 93 |
| Camera Mart: 25 | Energy Productions: 106 | LTM Corp.: 84 | National Geographic Society: 97 | Ulland, Bob: 7 |
| Camera Service Center: 5 | Engineering Model: 105 | Larry Edmunds: Bookshop Inc.: 107 | Newsfilm Laboratory: 107 | Ultra Light Manufacturing: 21 |
| Carpenter Sales: 105, 106, 107 | Excalibur Industries: 87 | Laumic Co.: 104 | Norris Film: 81 | Victor Duncan Inc.: 15 |
| Century Precision Optics: 108, 23 | Film Group: 98 | Lee Filters: 59 | Ocean Images: 100 | Whitehouse Audio: 106 |
| Chambless Productions: 105 | Focal Press: 16 | Leo's Camera: 49 | Otto Nemenz: 75 | Williams: 105 |
| Christy's Editorial: 102 | Foto-Kem Industries: 20, 21 | Light-Wave Systems: 102 | Palmer Films: 99 | Yale Laboratory: 107 |
| Cine Sound: 5, 105 | Fries Engineering: 89 | London International Film School: 103 | Plume Ltd.: 106 | Zellan: C-4 |
| Cine South: 105 | General Camera West: C-2 | | | |
| Cinefex Magazine: 73 | General Camera: 1 | | | |
| Cinema Products: 83 | | | | |
| Cinema Services Inc.: 6 | | | | |

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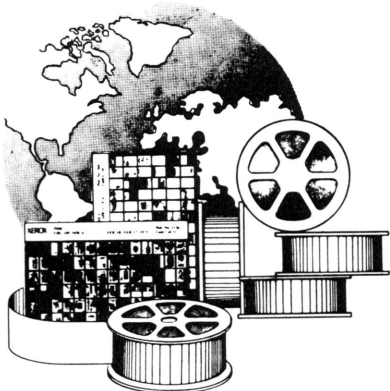
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From the Clubhouse

Five leading cinematographers participated in a seminar for members of the Academy of Television Arts & Sciences in March. The panel included Charles Correll, ASC, George Dibie, Laszlo Kovacs, ASC, Haskell Wexler, ASC and Harry Wolf, ASC. Wolf is a member of the ATAS board of governors.

Titled "Through the Eyes of the Camera," the evening included a viewing of clips from each cinematographer's repertoire and a brief discussion from each individual about his own methods of working with directors. Questions from the audience were fielded by panel members. After tricks of the trade were thoroughly examined, Wexler closed the evening with a memorable quotation: "We are all fakers. Filmmaking is an unnatural act."



*Daviau and crystal
award. below:
Fraker and Koch at
presentation.*

Asakazu Nakai for *Ran*. Presentations were made by William Koch, Eastman vice president, at a special banquet.

...

"The Art & Science of the Composite Image Through Matte Painting" was the subject of a program featuring Albert J. Whitlock, renowned matte artist. Whitlock spoke at a Clubhouse dinner meeting April 28 and was the second in the State-of-the-Art series speakers for 1986.

...

Otto Nemenz, president of Otto Nemenz International, is the newest associate member of the Society. He has been a part of the motion picture industry for 21 years and his firm deals in equipment rentals worldwide. Nemenz is also a cinematographer and photographed a number of features for ABC Circle Films.

Nemenz was born in Austria and received a degree in Optical & Precision Mechanics Engineering. His expertise with cameras has actively involved him in the design and production of accessories and modifications of equipment for special uses in the industry.



A.S.C. members honored with crystal trophies by Eastman Kodak Co., in March were William A. Fraker and Allen Daviau, a salute to their nominations for Oscars from the Academy of Motion Picture Arts and Sciences. Fraker's was for *Murphy's Romance* and Daviau's for *The Color Purple*. Others honored by Eastman were David Watkin, Oscar winner for *Out of Africa*, John Seale, ACS, for *Witness*, and Takao Saito, Masaharu Ueda and

Camera Co-Stars in *Violets Are Blue*



Ralf Bode, ASC, director of photography, and Jack Fisk, director, have worked together before. Their ability to fashion realism into a romantic background becomes manifest in a new Columbia release, *Violets Are Blue*. (They previously collaborated on *Raggedy Man*, 1980, and in 1979 Bode won an Academy nomination for his work on *Coal Miner's Daughter*.)

Violets Are Blue is essentially a "water color." The location is Ocean City, Maryland and almost every frame includes Chesapeake Bay or an inlet or an island with water in the background. The photography of a sailing race involving catamarans on the bay is particularly breathtaking, drawing the audience into the thrill of the competition 'midst the colorful sails.

Action shots of the ponies on Assateague Island and night for night

footage along a midway and during a nighttime rainstorm are particularly graphic. In the night scenes, Bode's camera follows his subjects along wet streets and between the pilings of a pier, striking a mood of impending failure for a romance that has blossomed too late.

The love story borders on the mundane, being significant only because of the players who manage to salvage the film through realistic handling of the dialogue. The cinematography is consistently applied to each mood and Spacek, Kevin Kline and Bonnie Bedelia are believable and endearing. Except for heart wrenching decisions, there are no villains.

Despite certain banalities that might put an audience to sleep, and a contrived montage at the beginning which gives Spacek's journalism career

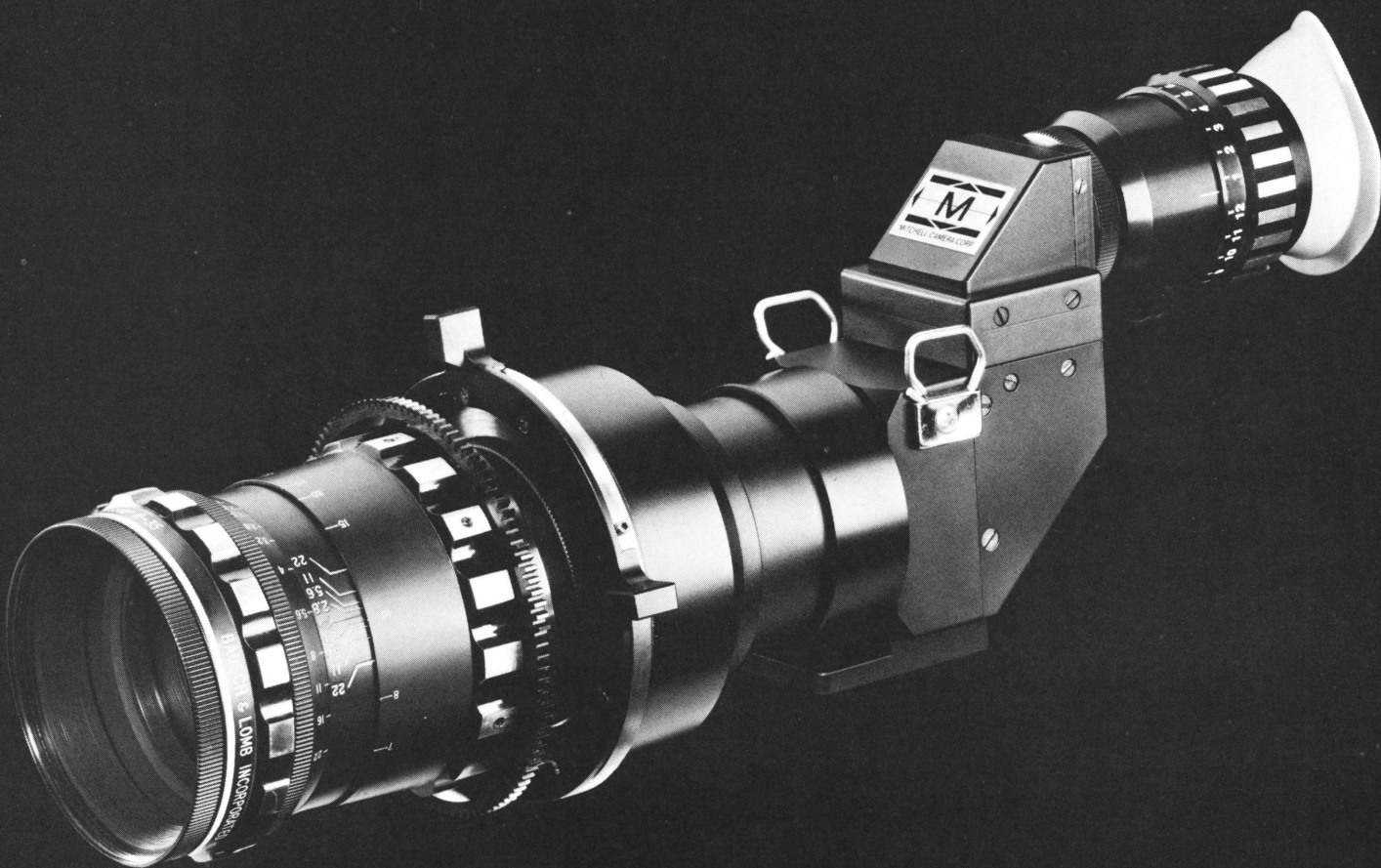
an unnecessary importance to the scheme, we become engrossed with the angles of the triangle and wish sincerely for pleasant resolutions to the love story. Bedelia's performance steals away the show for the most part.

By far, however, the most memorable feature of this picture is its cinematography, which never detracts, but adamantly devotes itself to accurate reporting of the scenes and characters. The backgrounds and the interiors are charming and real, thus leaving the audience believing. Closeups of Spacek range from beguiling tricks of soft lighting to merciless sunlight, all of which gives her character dimension and beauty.

At a running time of 88 minutes, the film is of an endearing length, as well.

— J.T.

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